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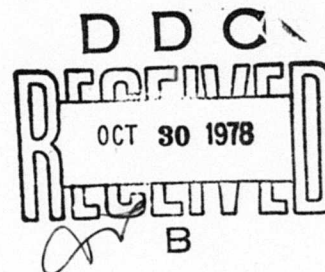
VOLUME I

INVENTORY SMOKE MUNITION TEST (PHASE IIa)

FINAL TEST REPORT

ADB031191

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JUNE 1978

U.S. ARMY DUGWAY PROVING GROUND
Dugway, Utah 84022

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A total of eight different smoke munitions were characterized to obtain physical and optical parameters (e.g., cloud density, particle size distribution, transmittance, cloud luminance and extinction coefficient) utilizing recently developed Dugway Proving Ground methodologies.		

SUMMARY OF RESULTS

A total of eight different smoke munitions were characterized to obtain physical and optical parameters (e.g., cloud density, particle size distribution, transmittance, cloud luminance, and extinction coefficient) utilizing recently developed methodologies. A summary of the items tested and references in the text as to the location of detailed test results are given in Table I.

Table 1 lists 24 of the 32 trials conducted during this test. The other 8 trials have been reported in "Smoke Week No. 1" (reference 1).

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Table 1. Summary of Inventory Smoke Munitions Trials

Trial No. 1	Trial Date	Fire Time	Type of Smoke	Caliber of Munition	Type of Munition	No. Fired/ Functioned	Page Number ¹
1R1	27 Oct 77	1456	HC	105mm	M84A1	3/2*	B-I-1, B-II-1
2	27 Oct 77	1224	HC	105mm	M84A1	9/8*	B-I-2, B-II-2
3	2 Nov 77	1346	HC	105mm	M84A1	18/18*	B-I-3, B-II-3
5	26 Sep 77	1248:02	WP	105mm	M60A2	1/1	B-I-4, B-II-4
6	5 Oct 77	1508	WP	105mm	M60A2	3/3	B-I-5, B-II-5
7	7 Oct 77	1238	WP	105mm	M60A2	6/6	B-I-6, B-II-6
9	23 Sep 77	1303	WP	4.2 in.	M328A1	1/1	B-I-7, B-II-7
10	6 Oct 77	1217	WP	4.2 in.	M328A1	4/4	B-I-8, B-II-8
11	7 Oct 77	1135	WP	4.2 in.	M328A1	8/8	B-I-21, B-II-21
13	27 Oct 77	1418	PWP	4.2 in.	M328A1	1/1	B-I-22, B-II-22
14	27 Oct 77	1327	PWP	4.2 in.	M328A1	4/4	B-I-9, B-II-9
15	26 Oct 77	1213	PWP	4.2 in.	M328A1	8/8	B-I-10, B-II-10
17	23 Sep 77	1218	WP	81mm	M375A2	1/1	B-I-11, B-II-11
18	23 Sep 77	1347	WP	81mm	M375A2	3/3	B-I-12, B-II-12
19	7 Oct 77	1336:32	WP	81mm	M375A2	6/6	B-I-13, B-II-13
21	5 Oct 77	1341:01	WP	155mm	M110E2	1/1	B-I-14, B-II-14
22	5 Oct 77	1433:01	WP	155mm	M110E2	3/3	B-I-15, B-II-15
23	6 Oct 77	1310	WP	155mm	M110E2	6/6	B-I-16, B-II-16
25	26 Oct 77	1430	HC	155mm	M116B1	4/4*	B-I-17, B-II-17
26	26 Oct 77	1324:20	HC	155mm	M116B1	12/12*	B-I-18, B-II-18
27	27 Oct 77	1147	HC	155mm	M116B1	24/15	B-I-19, B-II-19
29R2	7 Oct 77	1413	HC		M5 Smoke Pot	1/1	B-I-20, B-II-20
30	22 Sep 77	1238:11	HC		M5 Smoke Pot	4/2	**
31	23 Sep 77	1434:58	HC		M5 Smoke Pot	8/8	**

¹ See listed page number in Appendix B

* Canisters

** The clouds were too light for data to be analyzed

FOREWORD

At the direction of US Army Test & Evaluation Command, Dugway Proving Ground was responsible for the test planning, test execution and test reporting of this test. US Army Materiel Systems Analysis Activity provided the requirements, and the funding for this test program was provided by Department of Army, Office of the Project Manager for Smoke/Obscurants.

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SECTION 1. INTRODUCTION

1.1 BACKGROUND

The development and testing of more effective smoke screening systems requires the establishment of a reference data base and thus the characterization of existing smoke inventories. The concept of complete inventory characterization was discussed in the US Army Materiel Systems Analysis Activity (AMSAA) Smoke Meeting (reference 2) held at Dugway Proving Ground (DPG). As an initial step in accomplishing this goal, the US Army Test and Evaluation Command (TECOM), upon request by Department of the Army Office of the Project Manager for Smoke Obscurants (PM Smoke), directed (reference 3) DPG initiate a smoke test program to characterize (in a field environment) the 105mm, M84A1, HC projectile as well as other projectiles (81mm, 105mm and 4.2 inch) and the M5 smoke pot. The smoke systems include items containing HC (hexachloroethane, zinc oxide, aluminum mixture), WP (white phosphorus), and PWP (plasticized white phosphorus).

The physical and optical parameters of smoke clouds (e.g., cloud density, particle size distribution, transmittance and visual contrast) will be defined utilizing recently developed methodologies which will be established as standard test procedures. All current and future smoke weapon systems will be evaluated in a field environment using similar parameters and data requirements. Detailed data requirements to satisfy the test objectives are delineated in reference 4.

1.2 DESCRIPTION OF MATERIEL

This test characterized the smoke generated by the following eight munitions:

a. Cartridge, 105 millimeter: Smoke, HC, BC M84A1

(1) General. This cartridge used for screening, spotting and signaling, is issued with a filler (7.05 lbs) of HC (white) smoke.

(2) Description. Similar in construction to HE Cartridge M1, the base ejecting projectile is made from a hollow steel forging threaded at the rear to accommodate a steel base plug. An MT fuze is threaded into the nose of the projectile. The projectile body is fitted with black powder expelling charge in a rigid plastic container, three steel-encased smoke canisters, a centrally located flash tube and a steel baffle plate with flash hole. Aluminum spacers separate the expelling charge and the smoke canisters.

(3) Functioning. The expelling charge, ignited by the fuze, concurrently ignites the smoke canisters and produces gases which blow out the base plug and eject the burning canisters into the airstream. The canisters emit smoke for a period of 40 to 90 seconds.

(4) Tabulated Data.

(a) Characteristics

Complete round with fuze:

Weight (lb)	41.96
Length (in)	30.49

(b) Ballistics

Maximum muzzle velocity (fps)	1,550
Maximum range (yd)	12,330

(c) Components

Cartridge case	M14B4 or M14B1
Propelling charge (2.75 lb M1)	M67
Primer	M28B2 or M28A2

(5) Packing Data. One round per fiber container; two containers per wooden box.

b. Cartridge, 105 millimeter: Smoke, WP, M60A2(E3)

(1) General. This cartridge is intended for screening and spotting with a limited incendiary effect.

(2) Description. This cartridge is similar to WP Cartridge M60 except that it is assembled with burster M53A1 loaded with 0.21 pound of Composition B5. This cartridge may be stored and transported at temperatures up to +145°F. Burster M53A1 has a high-strength aluminum wall and a metal plug in the bottom end. A cushioning closure is cemented to the top of the Composition B5 charge. The projectile is normally fitted with a PD fuze. It is composed of a steel forging fitted with a steel adapter and gilding metal rotating band. The adapter serves two major functions: It provides a surface for sealing the forward end of press-fitted burster casing and provides a well for the fuze. The projectile is filled with 4.00 pounds of WP.

(3) Functioning. The projectile is normally functioned by impact which causes the fuze to function, detonating the burster which, in turn, ruptures the projectile and disperses the WP filler. Upon contact with air, the WP ignites, creating a dense white smoke cloud.

(4) Tabulated Data.

(a) Characteristics

Complete round with fuze:

Weight (lb).	43.81
Length (in).	31.07

(b) Ballistics

Maximum muzzle velocity (fps).	1,550
Maximum range (yd).	12,330

(c) Components

Propellant (2.75 lb M1).	M67
Primer	M28B2, M28A2
Cartridge case.	M14 series
Burster (0.21 lb Composition B5)	M53A1

(5) Packing Data. One round per fiber container; two containers per wooden box.

c. Cartridge, 4.2 Inch: Smoke, WP, M328A1

(1) General. This cartridge is used for screening, incendiary and casualty purposes.

(2) Description. This cartridge is similar to high-explosive cartridge M329A1 in its use of propelling charge M36A1 and in the design of the tail assembly (with container extension). Otherwise, it contains a perforated vane and is designed to accommodate a PD fuze and burster casing similar to the M2A1 smoke cartridges. The burster casing contains a burster initiator and a burster charge.

(3) Functioning. On impact, the functioning of the fuze detonates the burster which shatters the projectile casing, dispersing the filler (8.14 lbs WP). On contact with the air, the WP (or PWP) filler ignites, creating a dense, white smoke.

(4) Tabulated Data.

(a) Characteristics

Complete round with fuze:

Weight (lb)	24.91
Length (in)	21.01

- (b) Ballistics
- | | |
|---------------------------------|-------|
| Muzzle velocity (fps) | 845 |
| Range (yd) | 5,050 |
- (c) Components
- | | |
|------------------------------|-----------------|
| Propelling charge | M6 |
| Ignition cartridge | M2 |
| Burster | Integral w/fuze |

(5) Packing Data. One cartridge per fiber container; multiple overpack in wooden box.

d. Cartridge, 4.2 Inch: Smoke, PWP, M328A1

Same as M328A1 (see 1.2. c) with a fill of PWP.

e. Cartridge, 81 Millimeter: Smoke, WP, M375A2

(1) General. WP smoke cartridge M375A2, a companion round to HE cartridge M374A2, provides increased range, accuracy and terminal effectiveness over that obtained with WP smoke cartridge M370. Cartridge M375A2 is a modification of cartridge M375 with moisture resisting propelling charges and protective packaging.

(2) Description. The projectile of this cartridge is loaded with approximately 1.6 pounds of white phosphorus and contains a one-piece aluminum burster casing (M158) press-fitted to the forward end of the body. The burster casing houses a central burster tube containing RDX. The external shape is similar to cartridge M374A2.

(3) Functioning. Smoke cartridge M375A2 functions similarly to smoke cartridge M370 except that the M375A2 has a greater range and increased terminal effectiveness.

f. Projectile, 155 Millimeter: Smoke, WP M110E2

(1) General. This cartridge is similar to WP cartridges M110 and M110E1 except that it is assembled with Burster XM54 loaded with .46 pound of Composition B5. Since there is no tetrytol in the burster, this cartridge may be stored and transported at temperatures up to +145° F. Inspection of the fuze well-cup is required prior to firing. The M110E2 contains approximately 15.6 lbs of WP.

(2) Tabulated Data.

(a) Characteristics

Projectile:

Weight (as fired) (lb)	98.49
Length (w eyebolt lifting plug) (in)	26.78

(b) Ballistics

Maximum muzzle velocity (fps):

M3 charge	10,820
M4 or M4A1 charge	15,958
Burster (.83 lb tetrytol)	M6

g. Projectile, 155 Millimeter: Smoke, BE, M116B1 (M116E1)

(1) General Description. BE smoke projectile M116B1 differs from the M116 in that the expelling charge (0.34 lb of black powder) is contained in a polyethylene cup instead of a cloth bag. A steel closure disk, positioned just forward of the base plug, replaces the copper gasket used in the earlier model.

(2) Projectile, 155 Millimeter: Smoke, BE, M116A1

(a) General. BE smoke projectile M116B1 is used for screening, spotting and signaling purposes and is issued with a filler of either HC or a green, red, violet or yellow chemical smoke mixture. The HC fill is approximately 19.1 lbs.

(b) Description. This projectile is base ejection type with an expelling charge of 0.28 pounds of black powder positioned forward of a baffle plate in the nose of the projectile. The remainder of the cavity holds four canisters of smoke mixture arranged one behind the other. The forward canister is conical to conform to the taper of the cavity. A flash tube is formed by the hold in the baffle plate and the center tube of each canister. The base of the projectile is closed by a threaded base plug.

(c) Functioning. When the fuze functions, it ignites the expelling charge

in the nose of the projectile, sending a flame through the flash tube which ignites the smoke canisters. Concurrently, the force of the expelling charge blows out the base plug and ejects the canisters. An effective smoke cloud is emitted within 30 seconds of ignition; maximum emission occurs in about one minute.

(d) Tabulated Data.

1 Characteristics

Projectile:

Weight (as fired) (lb).	86.43
Length (w eyebolt lifting plug) (in).	26.41

2 Ballistics

Maximum muzzle velocity (fps):

M3 propelling charge	1,230
M4 or M4A1 propelling charge	1,840

Maximum range (yd):

M3 propelling charge	10,820
M4 or M4A1 propelling charge	15,958

h. The ABC-M5 30 Pound HC Smoke Pot

Description. The ABC-M5 30 pound HC smoke pot is a metal container, 8-1/2 inches in diameter and 9-1/2 inches high, filled with approximately 30 pounds of HC smoke mixture. A nonremovable outer cover provided with a circular tearstrip and two binding posts covers the pot, and an inner cover with a hole in the center covers the filling. Starter mixture is embedded in the filling directly under the hole in the inner cover. A matchhead is centered in the hole in the inner cover, and two electric squibs are placed close to the matchhead. A scratcher block in a paper envelope is packed between the inner and outer covers. The burning time is 12 to 22 minutes.

1.3 TEST OBJECTIVES

The objectives of this test are to obtain:

- a. Smoke characteristics of inventory smoke munitions.
- b. Data required by the JTCC/ME smoke obscuration model for evaluation of existing inventory munitions.
- c. Attenuation characteristics of inventory smoke munitions.

1.4 SCOPE

✓ This test program consisted of four trials for each of eight types of smoke munitions for a total of 32 trials. This procedure was changed for the 8 Smoke Week trials reported in reference I. → The smoke clouds generated by burning of HC, WP and PWP were characterized in a field environment using existing smoke methodology procedures. The various munitions were placed on the test grid in the quantities and patterns designated by the test sponsor. For the 105mm and 155mm HC projectiles the canisters from the designated number of projectiles were used. This test was conducted on the Horizontal Grid (Figure 1) at Dugway Proving Ground. Characterization included the physical and optical parameters of the screening clouds. The number of rounds/munitions fired during each trial were specified by AMSAA. All firings were static.

→ The smoke systems to be characterized include the following munitions:

- a. 105mm HC M84A1,
- b. 105mm WP M60A2,
- c. 4.2 Inch WP M328A1,
- d. 4.2 Inch PWP M328A1,
- e. 81mm WP M375A2,
- f. 155mm WP M110E2,
- g. 155mm HC M116B1,
- h. M5 HC Smoke Pot,

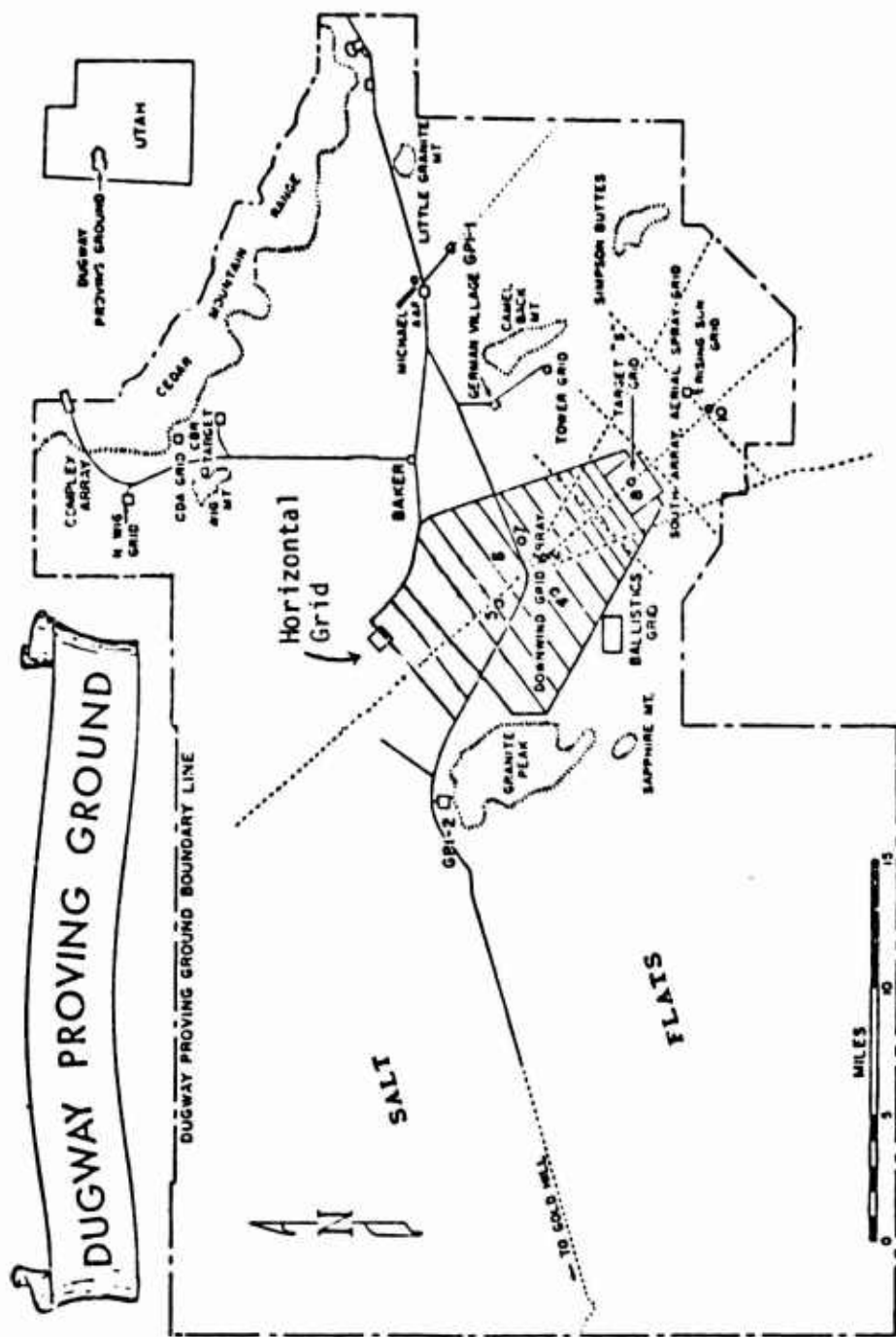


Figure 1. Location of Test Grid

SECTION 2. DETAILS OF TEST

2.1 OBJECTIVE

Same as paragraph 1.3.

2.2 CRITERIA

None.

2.3 DATA ACQUISITION PROCEDURES

2.3.1 Test Location

This test was conducted on the Horizontal Grid (Figure 1) located approximately 13 miles west of Ditto Technical Center, DPG.

2.3.2 Meteorological Limitations

a. There were no meteorological limitations for ambient temperatures or relative humidity.

b. Precipitation: None.

c. Wind speed: Winds to be between 2.5 and 5.5 meters per second or operationally acceptable.

d. Wind direction: Within $\pm 45^\circ$ from the normal to the sampling line.

e. Ambient light: Sufficient for photographic coverage.

f. Visibility: 10 miles.

g. Atmospheric stability: Neutral or inversion.

2.3.3 Grid Configuration

The test grid was configured for three optical paths, lines 1, 2 and 3 (Figure 2). Lines were 600 meters from the source to the detector and were 61 meters apart. Lines 1, 2 and 3 were located on rows Q, O and M, respectively, of the DPG Horizontal Grid, which are permanent roads. The sampling line was located on line 2 and was 300 meters long. The command post (CP) was at location 5. The instruments were located as shown in Table 2, 1.5 meters above ground level.

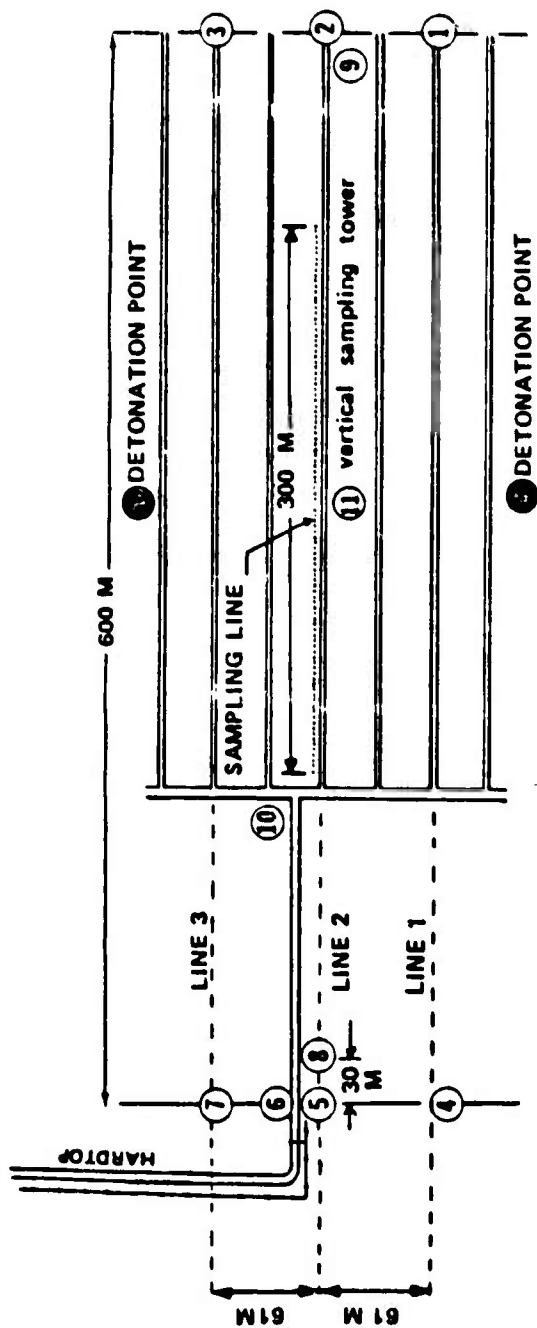


Figure 2. Bidirectional Smoke Test Grid
(For description, see text.)

Table 2. Location of Instruments on the Horizontal Grid (Figure 2)

Location	Instrument
1	Chopped source (3.4 μm)*
2	a. Chopped source (3.4 and 9.75 μm)* b. High intensity 6-8 v source, chopped* c. Black, white and OD telephotometer targets (see Figure 3)
3	Chopped source (3.4 μm)*
4	Receiver (3.4 μm)*
5	a. Receiver (1.06 μm)* b. Two telephotometers (0.4 - 0.7 μm) c. Telespectroradiometer (1.06 μm)
6	a. Receiver (3.4 μm)* b. Receiver (9.75 μm)*
7	Receiver (3.4 μm)*
8	Rotating black, white and open telephotometer target
9	32-meter meteorological tower
10	Receiver (1.06 μm)*
9 X	Chopped source (1.06 μm) at 17-meter level of the met tower, directed at position 10

* Instrument incorporated a 24-inch parabolic mirror.

2.3.4 Sampling

a. For aerosol sampling, 20 APs, three PSAs and 100 CIs were used. The samplers were positioned along a single line (see Figures 2 and 3), 1.5 meters above ground level.

b. The APs monitored the smoke concentration vs. time. Smoke concentrations were recorded on magnetic tape using recorders and appropriate encoders. AP positions were numbered 1 through 20 and are shown in Figure 2.

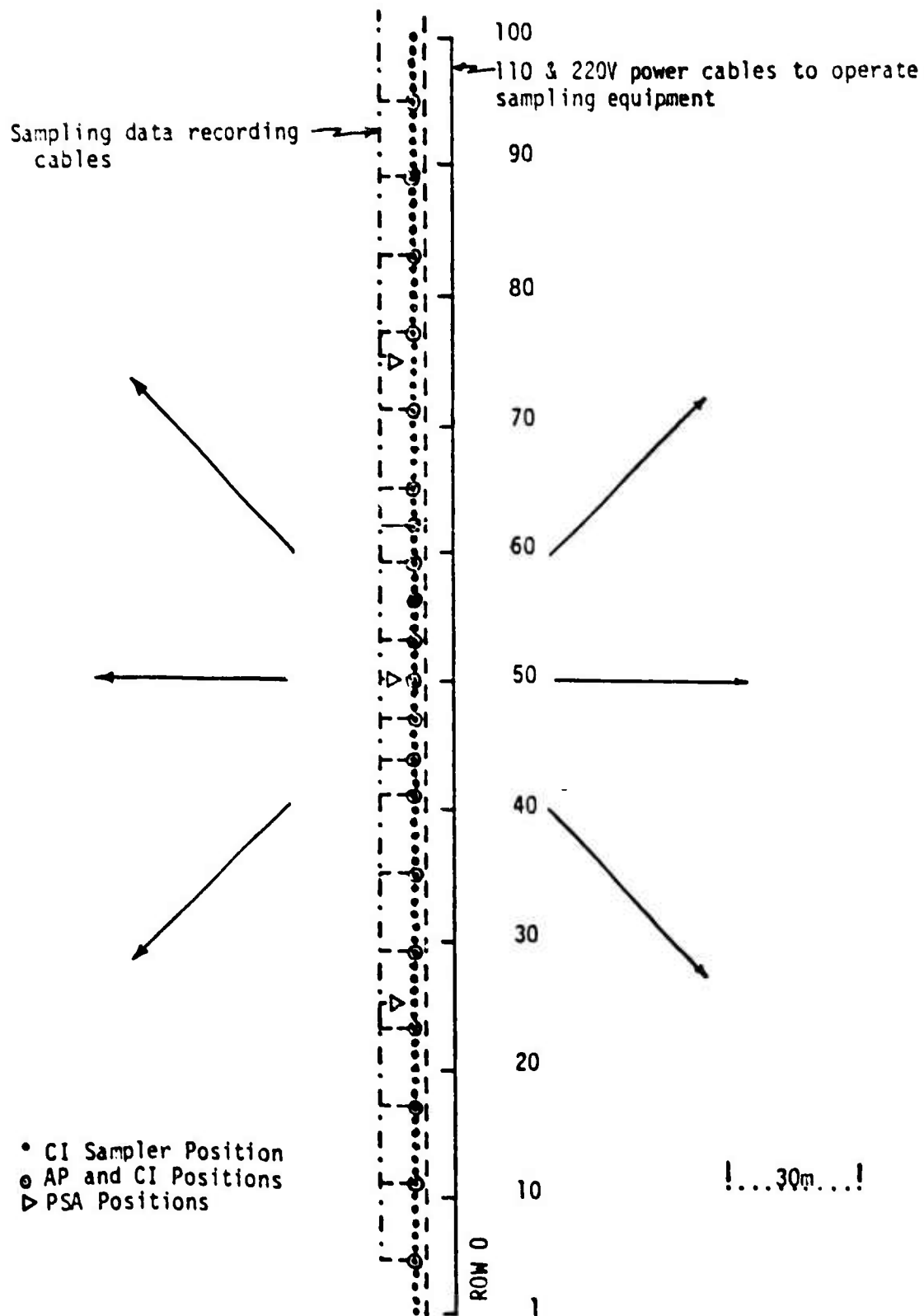


Figure 3. Sampling line as shown in Figure 2

c. CI samplers were placed along the sampling line to monitor the dosage of smoke during the sampling period. The CIs were numbered 1 through 100 and the positions were 3 meters apart and 1.5 meters above ground level. Sampling rate for the CIs was 6 liters per minute.

d. The PSAs with diluter were positioned at the center sampling position (CI position 50) and at CI positions 25 and 75 (see Figure 3). Output of the PSAs was recorded on magnetic tape for six size ranges (.3-.4, .4-.6, .6-.8, .8-1.0, 1.0-1.5 and 1.5-3.0 μm diameter).

e. The APs and PSAs were initiated at least 10 minutes (Z-10 minutes) prior to firing each trial to allow instrument warm-up and record dust background level. Sampling with the CIs was initiated at least 15 seconds (Z-15 seconds) before firing. Data from the APs and PSAs was recorded on magnetic tape and displayed on video monitors to aid the test officer in making judgments in the field. Data from at least three APs were recorded on strip charts to provide an immediate record of field data. Following cloud passage, sampling with the CIs was terminated 1 minute after the test officer announced "trial complete." Recording of data from the APs and PSAs continued for at least three minutes after trial completion.

f. Four control CIs were used for each trial for field and laboratory quality control. The control CIs were aspirated at 6 liters per minute but were located near the CP area, outside the smoke cloud.

g. In addition, there were five APs and five CIs at the 1.8-, 3.6-, 7.3-, 11.0- and 14.6-meter levels of the sampling tower (position 11, Figure 2). The procedures followed for the instruments paralleled those described above.

2.3.5 Optical Instrumentation

a. Optical instrumentation included telephotometers, transmissometers and a telespectroradiometer as indicated in Table 2. All electronic equipment was turned on at least 20 minutes (Z-20 minutes) prior to conduct of a trial. At Z-10 minutes, all optical equipment was operated for final check or calibration. Also, at Z-10 minutes, telephotometer No. 1 (position 5, Figure 2) was used to measure the luminance of the black, white and OD targets located as position 2. During acquisition of these data, the rotating disk at position 8 was not in the line of sight of the telephotometer. The luminance of the background at line 2 was also measured. The rotating disk (at position 8) was then moved on the line of sight with telephotometer No. 1 and the black target at position 2. At Z-5 minutes the following measurements were made for at least three minutes for each optical instrument:

Telephotometer No. 1 - Luminance (0.4-0.7 μm) of black and white sections of the rotating disk and the black target (through opening in disk) at position 2.

Telephotometer No. 2 - Luminance of chopped light source at position 2.

Telespectroradiometer - Luminance (1.06 μm) of the background.

Transmissometer (position 4) - Initial readings (no cloud) (3.4 μm)

Transmissometer (position 5) - Initial readings (no cloud) (1.06 μm)

Transmissometer (position 6) - Initial readings (no cloud) (3.4 μm)

Transmissometer (position 6) - Initial readings (no cloud) (9.75 μm)

Transmissometer (position 7) - Initial readings (no cloud) (3.4 μm)

b. Attenuation and cloud luminance measurements in the visible portion of the spectrum were accomplished using two telephotometers equipped with photopic corrective filters (0.4 - 0.7 μm) and 200mm lens having 2-minute arc aperture. The two telephotometers were located at position 5 shown in Figure 2. Over the 600-meter pathlength, telephotometer No. 2 was focused on a visible light source. The beam of light was chopped at a constant frequency to permit elimination of scintillation and background. The frequency at which the light was chopped was recorded. The measurements of telephotometer No. 2 were used to provide transmittance (visible) and telephotometer No. 1 was used to obtain cloud luminance. Telephotometer No. 1 was focused on a black target located at position 2 (Figure 2).

c. Transmittance at 1.06 μm was measured using a transmissometer receiver located at position 5 (Figure 2). The receiver monitored a chopped light source located at position 2. The frequency of the chopped source was monitored. A telespectroradiometer at position 5 was employed to measure cloud luminance at 1.06 μm .

d. Transmittance at 3.4 μm and at 9.75 μm (9-11 μm band) was measured using Nernst glowers and parabolic mirrors. The chopping frequency of the systems was monitored and recorded with the receiver data. The four receivers were located at positions 4, 6 and 7 (see Figure 2) and their associated sources located at positions 1, 2 and 3. The receivers at position 6 monitored the source located at position 2. The transmission data obtained from the systems were used to characterize the optical properties of the dust cloud and determine the extinction coefficients for smoke at the 3.4 and 9.75 μm wavelengths.

e. Multichannel recorders were used to record the output of the receivers, telephotometers, and telespectroradiometer. The recordings also contained a synchronized timing signal.

2.3.6 Operation

a. The test grid was prepared to include installation of samplers and placement of the test munitions. Firing points (see Figure 4 and Table 3) for the test munitions were selected based on the forecast of wind directions. Optical instruments were operated and calibrated as required prior to each day of operation.

Table 3. Location of Launching Points

Trial No.	Date	Firing Point
1R1	27 Oct 77	S4 (outside)
2	27 Oct 77	Centered on S3 (outside) 12 feet apart
3	2 Nov 77	Centered on S3 (outside) 12 feet apart
5	26 Sep 77	N5 (outside)
6	5 Oct 77	Centered on S5 (outside) 10 meters apart
7	7 Oct 77	Between N1 and N2 (inside) 10 meters apart
9	23 Sep 77	S3 (inside)
10	6 Oct 77	Centered on N4 (outside) 10 meters apart
11	7 Oct 77	Between N1 and N2 (outside) 10 meters apart
13	27 Oct 77	S4 (outside)
14	27 Oct 77	Centered on S3 (outside)
15	26 Oct 77	Centered on S2 (outside)
17	23 Sep 77	S2 (inside)
18	23 Sep 77	S3 (inside) 10 meters apart
19	7 Oct 77	Between N1 and N2 (inside) 10 meters apart
21	5 Oct 77	S3 (outside)
22	5 Oct 77	S5 (outside) 10 meters apart
23	6 Oct 77	Centered on N4 (outside) 10 meters apart
25	26 Oct 77	N5 (outside) 12 feet apart
26	26 Oct 77	Centered on S3 (outside) 12 feet apart
27	27 Oct 77	Starting at S2 (outside) 12 feet apart
29R2	7 Oct 77	N3 (inside)
30	22 Oct 77	N2 (inside) 10 meters apart
31	23 Sep 77	S3 (inside) 10 meters apart

b. All test data were recorded relative to time. All charts and tapes had time data inserted using the Inter-Range Instrumentation Group Time (IRIG-B)

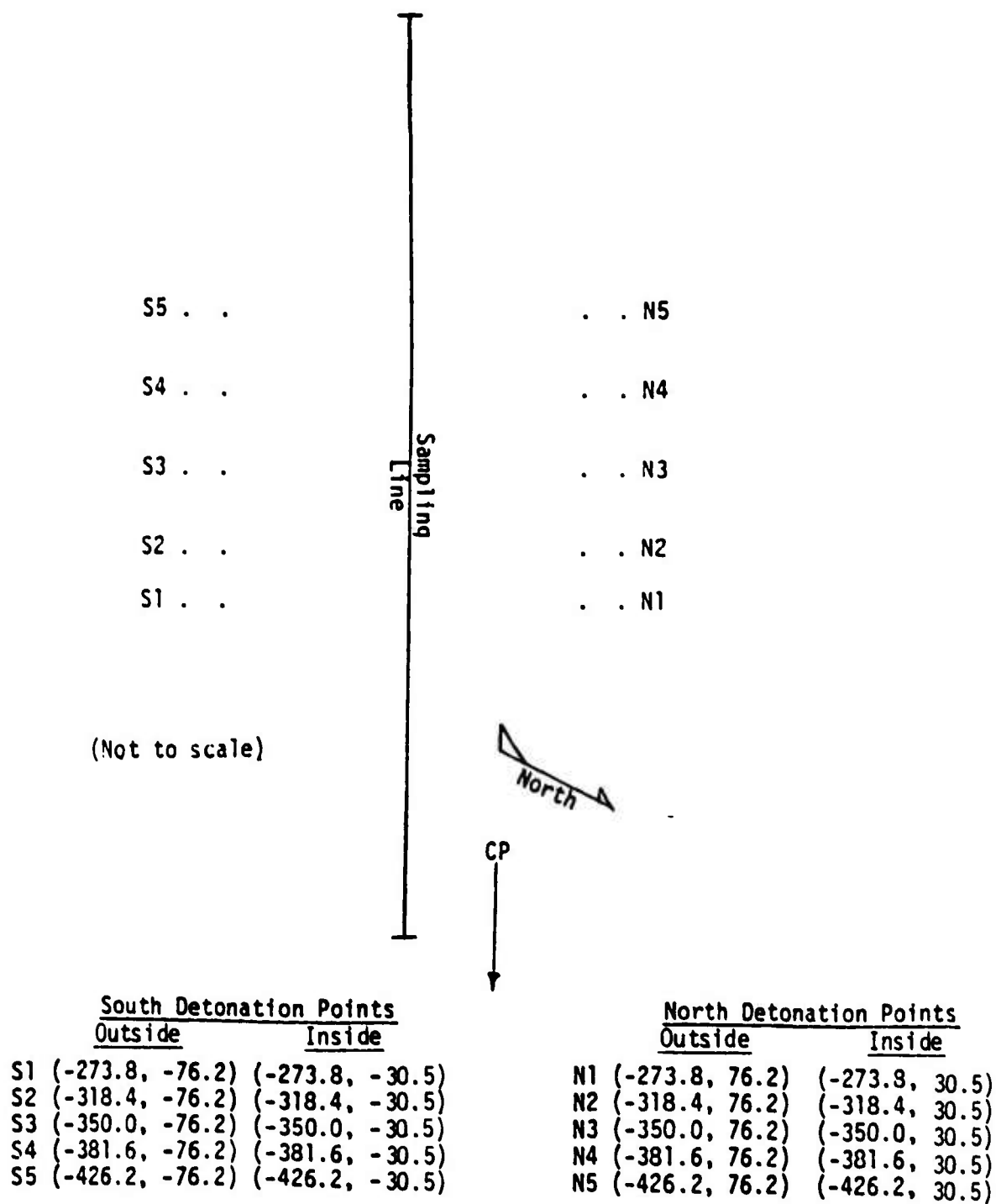


Figure 4. Detonation Point Locations

system. Clocks were synchronized prior to each day's operation and verified prior to each trial.

c. An appropriate radio net was established to allow communication between the test officer, safety officer and other pertinent personnel. An emergency channel was also established.

d. The test officer made a final check prior to each firing to assure that (1) instrumentation was checked for proper operation, (2) samplers were in place, (3) munitions were placed on the grid in accordance with recent meteorological data, (4) meteorological conditions were acceptable and (5) support facilities were ready. Munition fire time was designated "Z-time." The test officer gave the command to fire when all systems were ready. Sampling, photographic and meteorological data were recorded during each trial. Utilizing visual observation and video display, the test officer announced the trials complete when, in his judgment, the smoke cloud had passed and was no longer effective or present. All sampling was terminated in accordance with the sampling schedule and preparations made for the next trial.

2.3.7 Photographic

a. Motion picture cameras were used to record the height, width and geometric characteristics of the aerosol clouds. Cameras were located at four positions (see Figure 5). The remotely operated 35mm cameras operated at 10 pps or less. Stadia markers were placed so that at least two markers were in the field of view of each camera at all times. The distance between the markers and the distances from the camera were recorded.

b. The cameras were initiated prior to munition detonation (Z time). Recording time for the 35mm cameras was from Z-10 seconds to trial completion, using IRIG-B time to synchronize the cameras. The cameras were 1.5 meters above ground level.

c. Prior to each trial, the brightness of the sky was measured horizontally and at 5 degree increments to 45 degrees.

d. A color TV video recording system was used to record the screening operation. The TV camera was placed (in the vicinity of the CP) so that its field of view was similar to that of the optical instruments. The system was available for immediate playback and review of the screening operation.

2.3.8 Meteorological

a. A 32 meter tower was used to record the meteorological data.

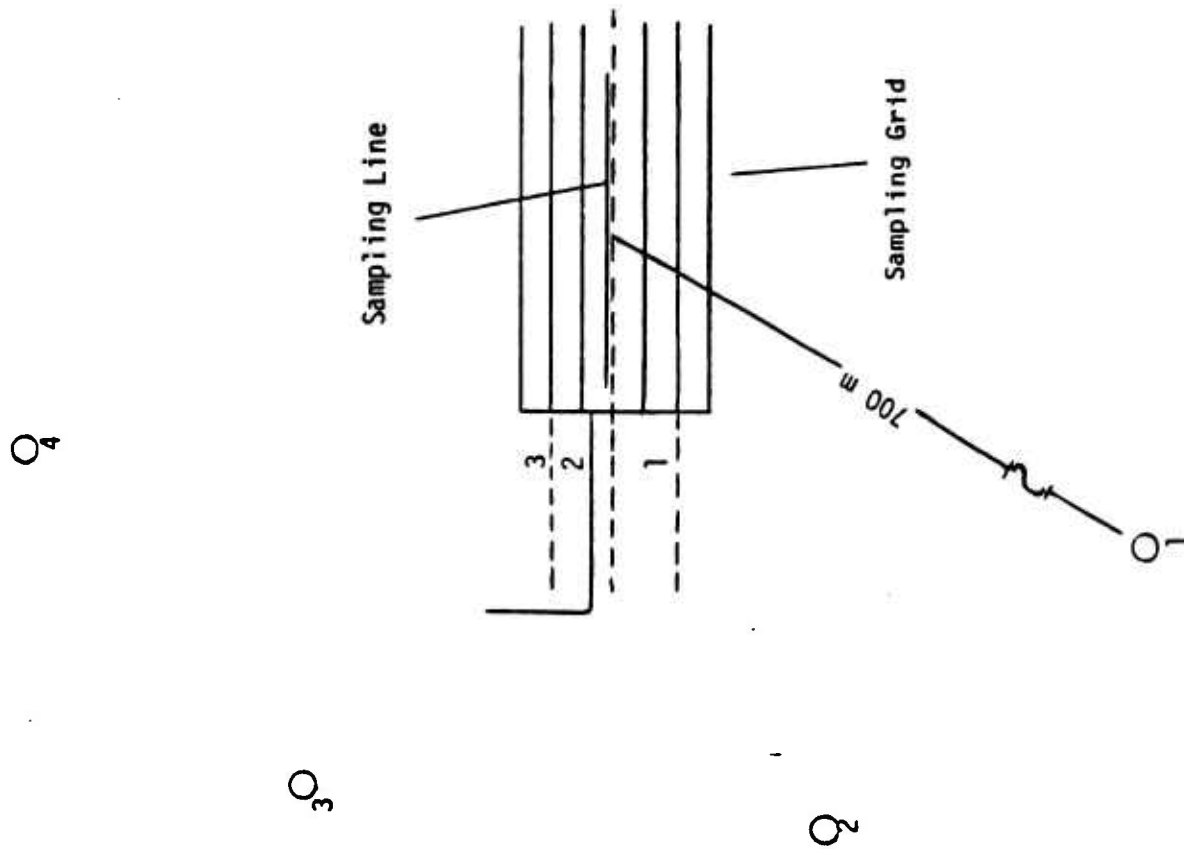


Figure 5. Diagram of Camera Positions

The tower was equipped to measure temperature at 2 meters and profiles of temperature gradient and wind speed at 0.5, 2, 4, 8, 16 and 32 meters. The horizontal and vertical components of the wind direction were measured at 2, 8, 16 and 32 meters. Directional components and wind speed at the same levels were collected every tenth of a second. Automatic Data Acquisition System (ADAS) data collection backup was on critical mode. The MESONET provided wind data at the 8 meter level for test control. Data from the 32 meter tower were telemetered to the processing system and processed at 1-minute intervals from Z-5 to Z+20 minutes for the firing of each projectile. Five-minute processing intervals were used for other portions of the trials.

b. Prior to firing each munition, and every half hour during the firing operations, measurements were made of the barometric pressure, ambient cloud coverage (percentage), ambient visibility, temperature, relative humidity and solar radiation. The position of the sun at the time of round detonation was calculated using data from the equations of the Aeronautical Almanac and Table 170 of the Smithsonian Meteorological Tables.

2.3.9 Laboratory

CI samplers were assayed for phosphorus in accordance with the appropriate DPG SOP. Samplers not analyzed on the day of the trial were kept in refrigerated storage until analysis was performed.

2.3.10 Calibration

All instrumentation used for data acquisition, repair and maintenance was calibrated prior to use. Also, instrumentation used for data acquisition, not certified by DPG calibration facility, was verified as to its functional capability with current certified instrumentation.

2.4 RESULTS

2.4.1 Summary of Test Day Data

Included with the tabular data of the trials in Appendix B, specifically, in Section 1, are summaries of pertinent test data, including the following:

- Trial number, date and time
- Record of the luminance of black absorber, diffuse white reflector, OD target, background and haze
- Detailed meteorological data
- Solar azimuth and altitude
- Solar radiation

Prevailing visibility
Brightness of the sky, horizontally and at 5 degree increments
to 45 degrees
Percent cloud cover
Cloud dimensions (see below)
Documentary photographs

2.4.2 Meteorological Data

All trials were conducted within wind direction limitations of the test plan, Pasquill C stability category, and with visibility exceeding 10 miles. In some trials the mean transport wind speed exceeded the desired wind speed. This did not adversely affect the data in any way. Experience has shown that the wind limitations were unduly restrictive. Summaries of meteorological conditions prevailing during the trials are found in Appendix B.

Note: The selection of the "Pasquill" stability category is based on an objective method proposed by Turner (reference 8) in 1961. This method defines the degree of insolation (net radiation index) in terms of solar altitude, cloud cover, and cloud height. The stability category is then derived as a function of the net radiation index and the wind speed averaged at the 10-meter level.

2.4.3 Targets

Black, white and OD-colored targets were 4 feet square and had a smooth, virtually nonreflective surface. The background along all three optical paths was formed by Granite Peak, at a distance of approximately 10 km to the base of the mountain and 11.5 km to the peak. The surface of this prominent terrain feature is dark grey and extremely rugged with some vegetation on various locations at lower elevations. Aside from this feature, the terrain along all optical paths is substantially flat and devoid of significant vegetation except for very sparse clumps of brush not exceeding 1.5 feet in height.

2.4.4 Cloud Dimensions

Cloud dimensions are provided for intervals of 10 seconds. In all cases, the wind "took over," i.e., governed the dimensions of the clouds, before 10 seconds had elapsed. This conclusion was confirmed by recent reexamination of films.

2.4.5 Documentary Photography

Documentary photographs inclosed are for characteristic conditions, i.e., for the instant of munition functioning and for the approximate time the cloud attained its maximal dimensions.

2.4.6 Chemical Impinger Data

Analyses of chemical impingers for total phosphorus are conveniently transformed into "dosages," taking yield factors into consideration. For the present, the term "dosage" has been retained for tests of smokes and other obscurants because it is well established and unequivocally understood. Dosages represent concentrations at given locations (generally expressed in mg/m^3 or g/m^3) integrated through time. In these trials, "time" is the entire period of cloud passage. Dosages are not only readily determined, but also extremely useful for calculations of extinction coefficients of unconfined clouds and for CL values (references 4 and 5). The validity of dosage values hinges on a number of factors: Accurate information on sampler collecting efficiency, proper interpretation of analytical data, and application of correct yield factors. Samplers have been carefully calibrated (reference 5).

2.4.7 Dosages

Dosage data are shown in Appendix B (B-I and B-II). They demonstrate that test control was excellent in all cases, the cloud having been contained within the sampling array and, thus, being suitable for analysis. Moreover, the crosswind dimensions of the cloud can be determined from these data and wind direction, as well as permit estimates of the distance of the clouds (at some specified dosage cut-off value) from the targets, should this information be desired.

It is important to recognize that the dosages presented in this report are based on the total phosphorus recovered in CIs and conventionally accepted yield factors (see discussion in reference 5). Because of the ambiguity of these yield factors, emphasized in reference 5 and reference 6 a methodology study was conducted to determine whether they were valid for the trials conducted at DPG. Results demonstrate that empirical yield factors differ slightly from theoretical values, as further described in reference 7.

2.4.8 Optical Instrumentation, Aerosol Photometers and Particle Size Analyzers

Appropriate instrumentation data were collected as described in paragraph 2.3.5 and recorded as an analogue signal on magnetic tape. The analogue tapes were digitized for processing and then were reduced to values through time.

These data are shown in Appendix B (B-1 and B-II). Details of the data reduction procedures are shown in reference 4. In general, the required data were obtained, and equipment functioned as intended.

2.5 ANALYSES

2.5.1 Dosages of Smoke and Yield Factors

The procedure for calculating values of extinction coefficients from dosages and transmittance-time data has been described (reference 4). It is an expeditious approach to obtaining the values in the field and, for unconfined clouds of smokes, so far the only practical and operational method (reference 7).

2.5.2 Extinction Coefficients

The method for calculating extinction coefficients from field data was presented in reference 4 and elsewhere. Extinction coefficients can be calculated for a given wavelength from the time integral of the negative logarithm of the transmittance divided by the dosage of obscuring material integrated over the distance of the optical path, provided the time intervals for transmittance and dosage determinations correspond.

Extinction coefficients were computed directly for 1.04 and 3.4 μm , as per reference 4. For other wavelengths, ratios of extinction coefficients were first determined (reference 4), and then extinction coefficients were calculated using the value for 1.06 or 3.4 μm . Table 4 shows results from these computations.

Table 4. Extinction Coefficients (m^2/g) and Ratios at Various Wavelengths

Trial No.	Type of Smoke	$\alpha(1.06 \mu\text{m})$ (m^2/g)	$\alpha(3.4 \mu\text{m})$ (m^2/g)	$\frac{\alpha(.4-.7 \mu\text{m})}{\alpha(1.06 \mu\text{m})}$	$\frac{\alpha(3.4 \mu\text{m})}{\alpha(9.75 \mu\text{m})}$
1R1	HC	.86		3.1	
2	HC	.62	0.12		1.8
3	HC		0.11	4.1	2.3
5	WP	.63	0.20		1.0
6	WP	.71	0.32		0.98
7	WP	.61	0.20		0.96
9	WP	.65			
10	WP	.43	0.16		0.80
14	WP	.42	0.18	3.6	0.73
15	WP		0.19		0.72
17	WP		0.35		
18	WP	.69	0.29		0.69
19	WP	.60	0.21		0.92
21	WP	.76	0.21		0.76
22	WP	.49	0.23		0.93
23	WP	.48			
25	HC	1.1	0.10	3.5	2.1
26	HC		0.89		3.0
27	HC	0.89	0.074	3.0	3.2
29R2	HC	1.5		3.2	
31	HC	0.91	0.14	3.4	2.4

Summary

$\lambda (\mu\text{m})$	HC $\alpha(\text{m}^2/\text{g})$	WP $\alpha(\text{m}^2/\text{g})$
.4-.7	3.3	2.1
1.06	0.98	0.59
3.4	0.11	0.23
9.75	0.044	0.27

2.5.3 Transmittance and Concentration-Length Product (CL)

The transmittance of a cloud is defined as the ratio of the energy of emergent electromagnetic radiation to the energy incident upon the cloud, I/I_0 in the Beer-Lambert equation. This dimensionless value ideally expresses the attenuation of electromagnetic radiation on passage through the cloud by processes which divert the radiation from the optical path, both by scattering and absorption.

The total time of cloud passage across the optical path can be gauged from the fall and rise in transmittance values. In turn, time for cloud passage is governed by the impact pattern of munitions fill or submunitions, the burn time and rate of the smoke agent, the wind velocity and turbulence, and the distance from impact area to the optical path. Evidently, the time of cloud passage permits only the most tenuous estimates of smoke agent burn time, but mathematical models may permit calculation of such estimates with the proper input data.

For illustrative purposes, the relationship between transmittance values at different wavelengths for the same optical path is seen in Figure 6, for a trial with HC. The extinction at $9.75 \mu\text{m}$ for HC is smaller than that for $3.4 \mu\text{m}$, hence, HC is less effective as an obscurant at $9.75 \mu\text{m}$ than at $3.4 \mu\text{m}$. For white phosphorus (WP), the relationship is reversed (Figure 7): The extinction coefficient α ($9.75 \mu\text{m}$) is slightly larger than α ($3.4 \mu\text{m}$). Therefore, transmittance at the longer wavelength is less than that at $3.4 \mu\text{m}$. Relevant evidence is seen in data from this test. (See Appendix B-I and B-II.)

As indicated above, extinction coefficients and transmittance as a function of time can be used to compute CL as a function of time, i.e., integrated concentrations along a line of sight. Tabular values are shown in Appendix B-I and B-II, respectively.

Some analytical procedures employed at DPG for characterizing clouds of smoke assume that the Beer-Lambert law is obeyed. This assumption is seen to be sufficiently valid when one compares CL values obtained by calculation from transmittance and extinction coefficients with CL values obtained by use of APs for the same optical path. These two independent approaches yielded virtually identical results, although only one depends upon transmissometry. Such differences as may appear to exist are attributable to the distance (10 meters) between APs and optical path of transmissometer, which results in a time shift. (For example, at 3 meters per second wind speed, normal to the optical path, there would be a difference of 3.3 seconds between measurements of the "same" part of the cloud.)

There is an important corollary to the finding that CL values derived from APs are satisfactory. If APs can be substituted for CIs in many applications for

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0

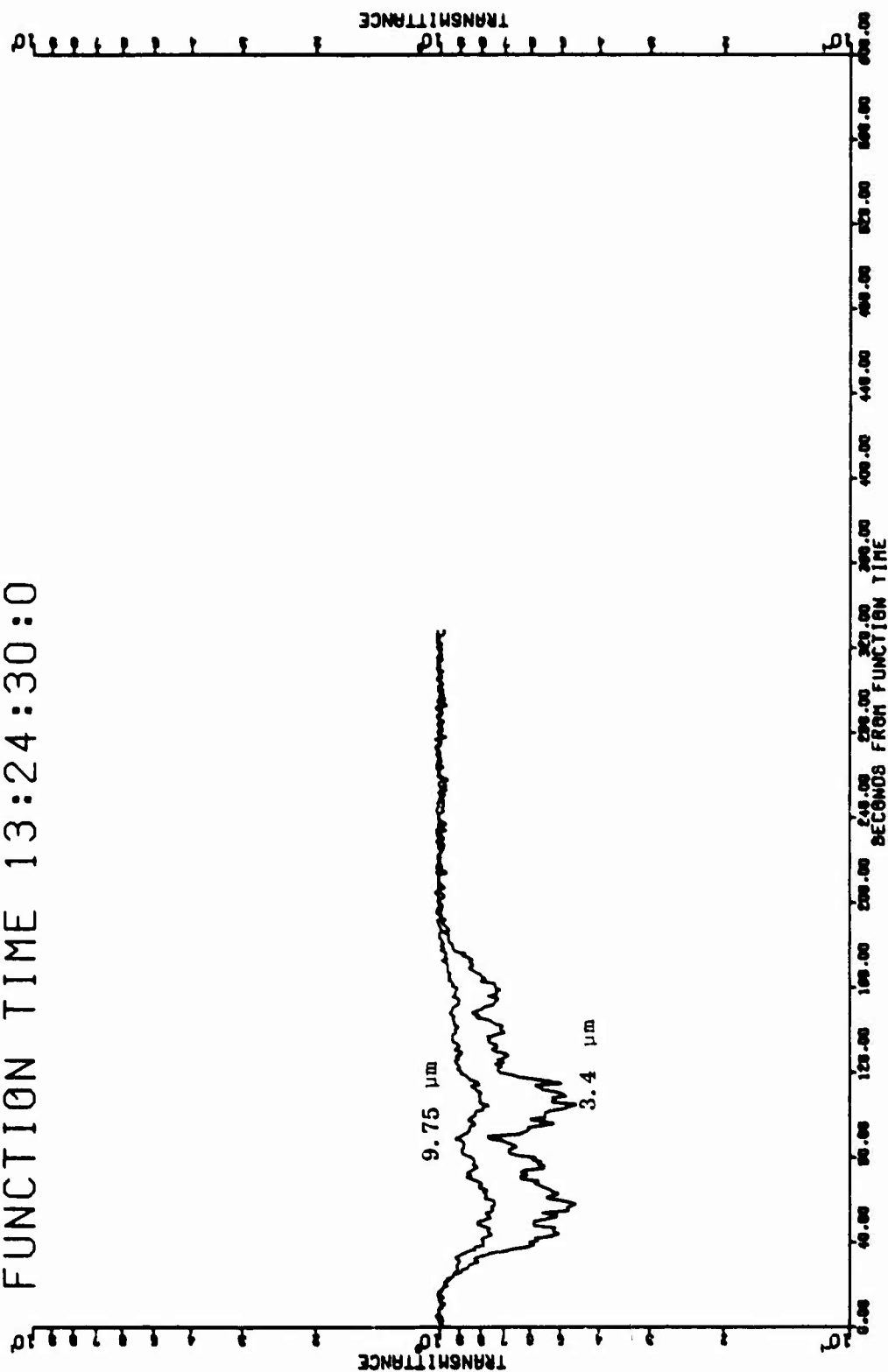


Figure 6. Transmittance Versus Time for Wavelengths 3.4 and 9.75 on Row O

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:1:0

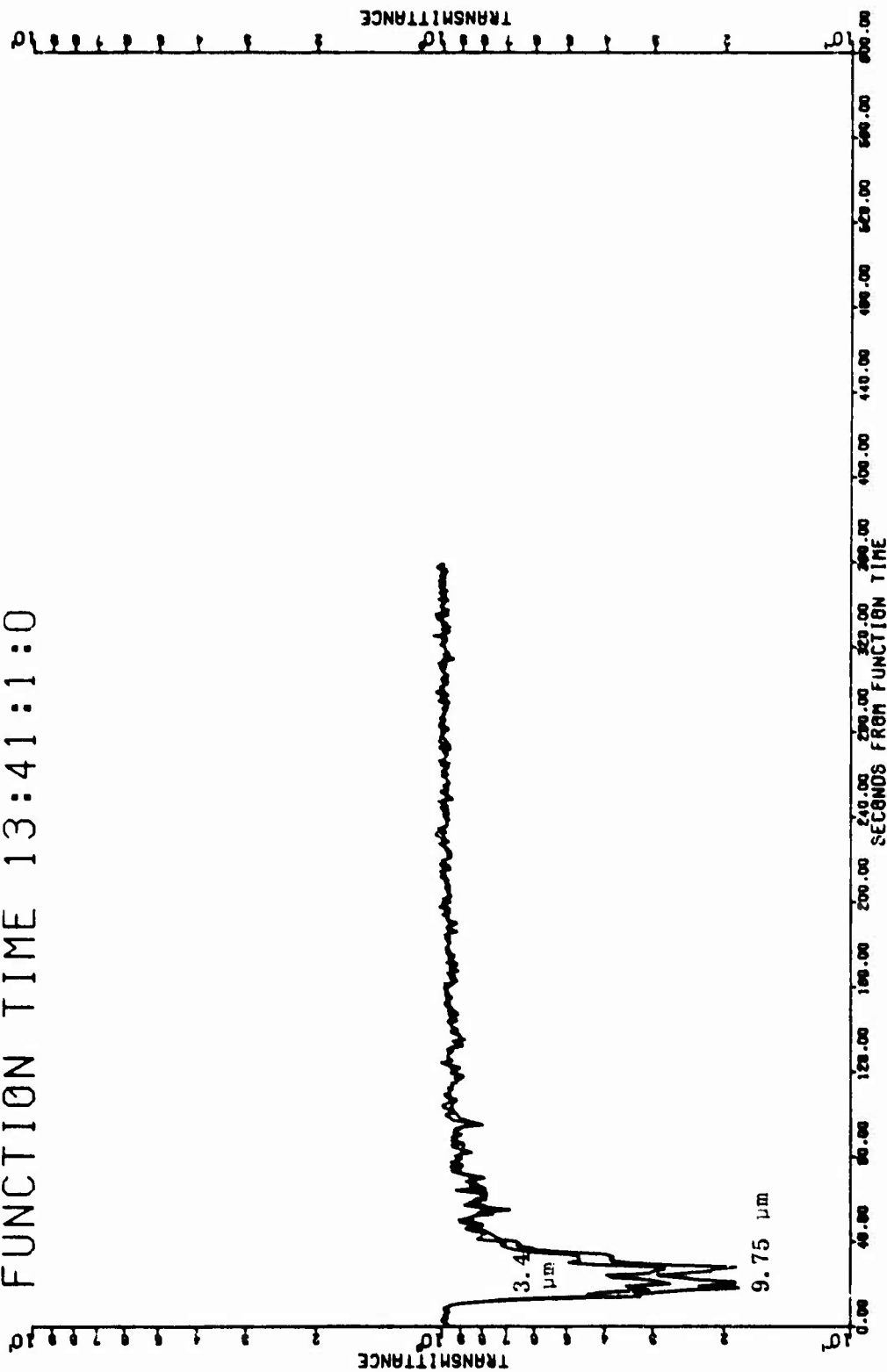


Figure 7. Transmittance Versus Time for Wavelengths 3.4 and 9.75 on Row O

determination of CL values and for calculation of extinction coefficients, the last laboratory-type operation would be eliminated because the need for CIs would be obviated, and all data acquisition and reduction could be performed automatically. This step would bring about uniformity in data reduction. Nevertheless, CIs are intrinsically more fieldworthy instruments than APs, and so, the advantage is not achieved without some cost.

2.5.4 Calculated Transmittance

Conventional smokes, for example, phosphorus and HC smokes, were originally selected because they obscure vision. It has since been discovered that their effectiveness as obscurants is significantly greater in the visible part of the electromagnetic spectrum than in the infrared. As a result, a given cloud may, at some optical path, attenuate visible light many orders of magnitude more than infrared radiation, rendering visible-light transmissometers useless for some or much of the time of cloud passage. There are consequent gaps in transmission curves for visible light, i.e., segments where readings fall into the noise level. It is possible to generate the missing segments if the ratio between extinction coefficients in the visible part of the spectrum and at some longer wavelength is known (reference 4). This relationship can be deduced from transmission curves alone. Calculated transmission curves are given for the visible (.4-.7 μm) in Appendix B-I and B-II.

For practical purposes, at present, a cloud may be considered opaque if it attenuates light by 95% to 98% (transmittance = 0.05 to 0.02).

2.5.5 Luminance of Clouds

Measurements of cloud luminance in the visible range (0.4-0.7 μm , photoptically corrected). (See Appendix B-I and B-II.)

Review of these curves will show that the peak of cloud luminance occurs during cloud passage, exactly as expected. However, a number of the charts exhibit erratic ancillary peaks which are attributable to noise. The source of this interference is not known with certainty. It is surmised that the noise originates during collection of data for correcting luminance to the initial environmental brightness level, probably because of poor alignment of the telephotometer. This condition will be remedied in the future. For the time being, no further attempt can be made to improve data quality. It must be emphasized, however, that cloud luminance in the visible range (photoptically corrected) is also extractable from other telephotometric data which should be free of this defect. Changing of software and reprocessing of tapes will be necessary for this purpose. Therefore, if improved data are required, a separate request for recovering the data should be made to DPG.

Data for cloud luminance at 1.06 μm , which may find use in assessing the performance of electro-optical devices operating at the wavelength of the Nd-YAG laser, appear to be satisfactory. These data are also found in Appendix B-I and B-II.

2.5.6 Particle Size Data

Comprehensive details on smoke particles are provided in Appendix B-I and B-II, giving particle size distribution based on number, the proportion of particles in various ranges as a function of time, and average number median diameter (NMD) as a function of time. In interpreting these time-related data, it should be kept in mind that, when the curves extend beyond periods of cloud passage, apparent aberrations may be seen in those segments which do not represent part of the cloud.

Additional data are also included in the Test Day Data Summaries, Appendix B. In general, no surprising features were observed.

SECTION 3. APPENDICES

APPENDIX A. TEST CRITERIA

NOT USED

No criteria were provided.

APPENDIX B. TEST DATA

PLOTS OF TEST DATA AND TEST DAY SUMMARY B-I

APPENDIX B-I-1

TRIAL DP1-002-T-1R1 (HC SMOKE) 27 OCT 1977

SUMMARY OF TEST DATA	B-I-1-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-1-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-1-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-1-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-1-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-1-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-1-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-1-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-1-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-1-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-1-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-1-20
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-1-21
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-1-22
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-1-23

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 B-I-1-24

FIGURE: PARTICLE SIZE DISTRIBUTION ND

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME ND

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME ND

SUMMARY OF TEST DAY DATA

Trial: 1R1

Date: 27 Oct 77

Time: 1456:00 MDT

Wind Direction (Transport) (degrees) (4m)	183
Mean Wind Speed (Transport) (\bar{u} , m/sec)	5.9
Temperature at 2-meters, Trial Time (T, °C)	23.5
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	12.4
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	5.4
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.5
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.14
Pasquill Stability Category	D
Relative Humidity (percent) (2m)	17
Solar Azimuth (deg)	208.9
Solar Altitude (deg)	32.0
Air Density - ρ (kg m ⁻³)	1.009
Solar Radiation (Langleys per minute)	0.663
Barometric Pressure (millibars)	862.5
Visibility (km)	97
Reflectivity, OD Target	0.09
Haze (footlamberts)	324
Brightness, Background (footlamberts)	1200
Brightness, White Target (footlamberts)	1966
Brightness, OD Target	500
Percent Opaque Cloud Cover	6

Munitions/Submunitions Used (HC, 105mm) 3

Number of Munitions/Submunitions Functioned 2

Particle Size Range (micron) *

(0.3 - 0.4)

(0.4 - 0.6)

(0.6 - 0.8)

(0.8 - 1.0)

(1.0 - 1.5)

(1.5 - 3.0)

Log₁₀NMD

σLog₁₀NMD

NMD

MMD

*No data available.

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1456:00*	3	2	2
1456:10	37	15	4
1456:20	52	28	5
1456:30	96	29	8
1456:40	124	27	12
1456:50	131	26	15
1457:00	137	25	19
1457:10	137	27	19
1457:20	137	29	19
1457:30	140	29	21

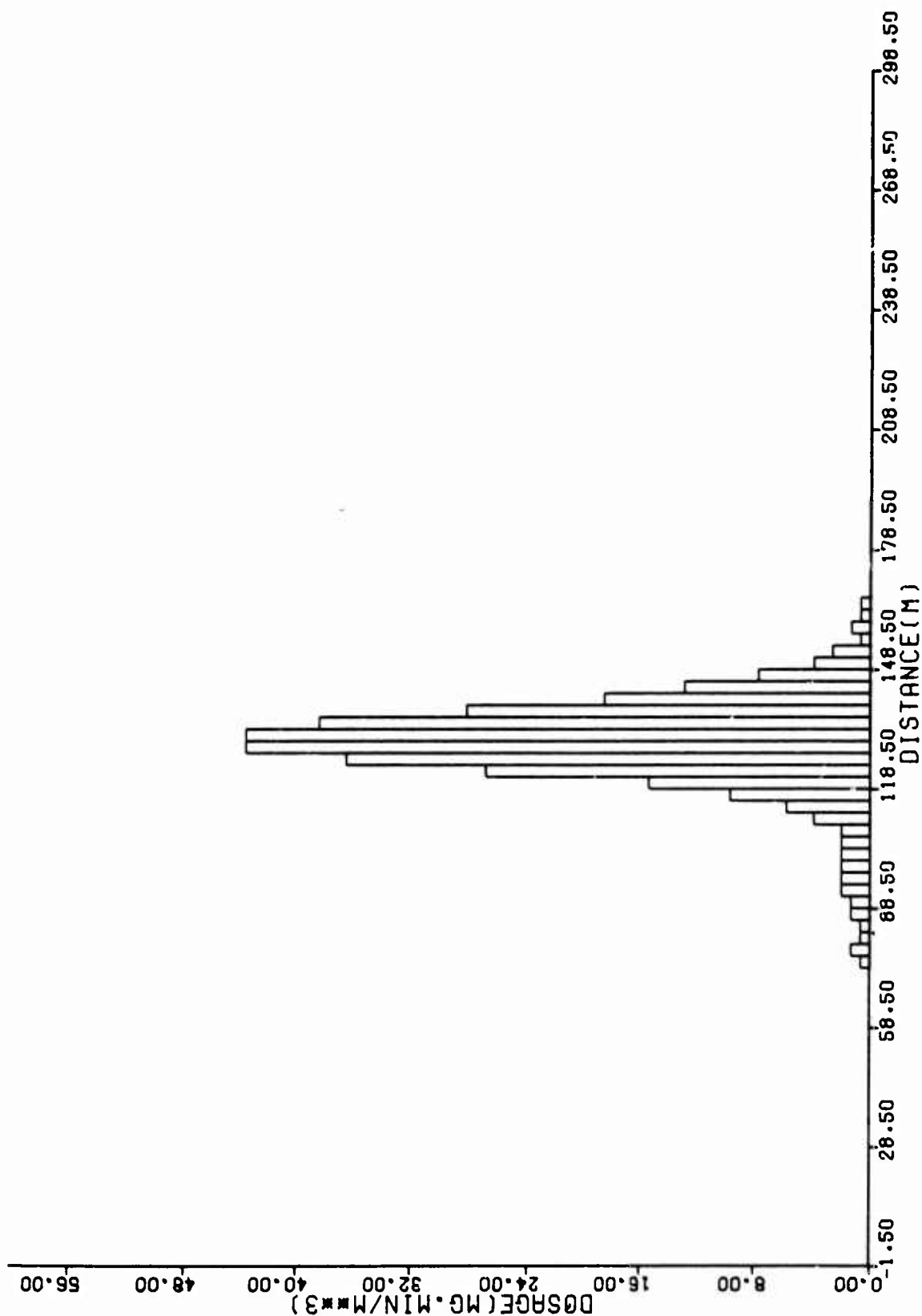
*Only one cartridge was
ignited during this
picture frame.

SKY BRIGHTNESS

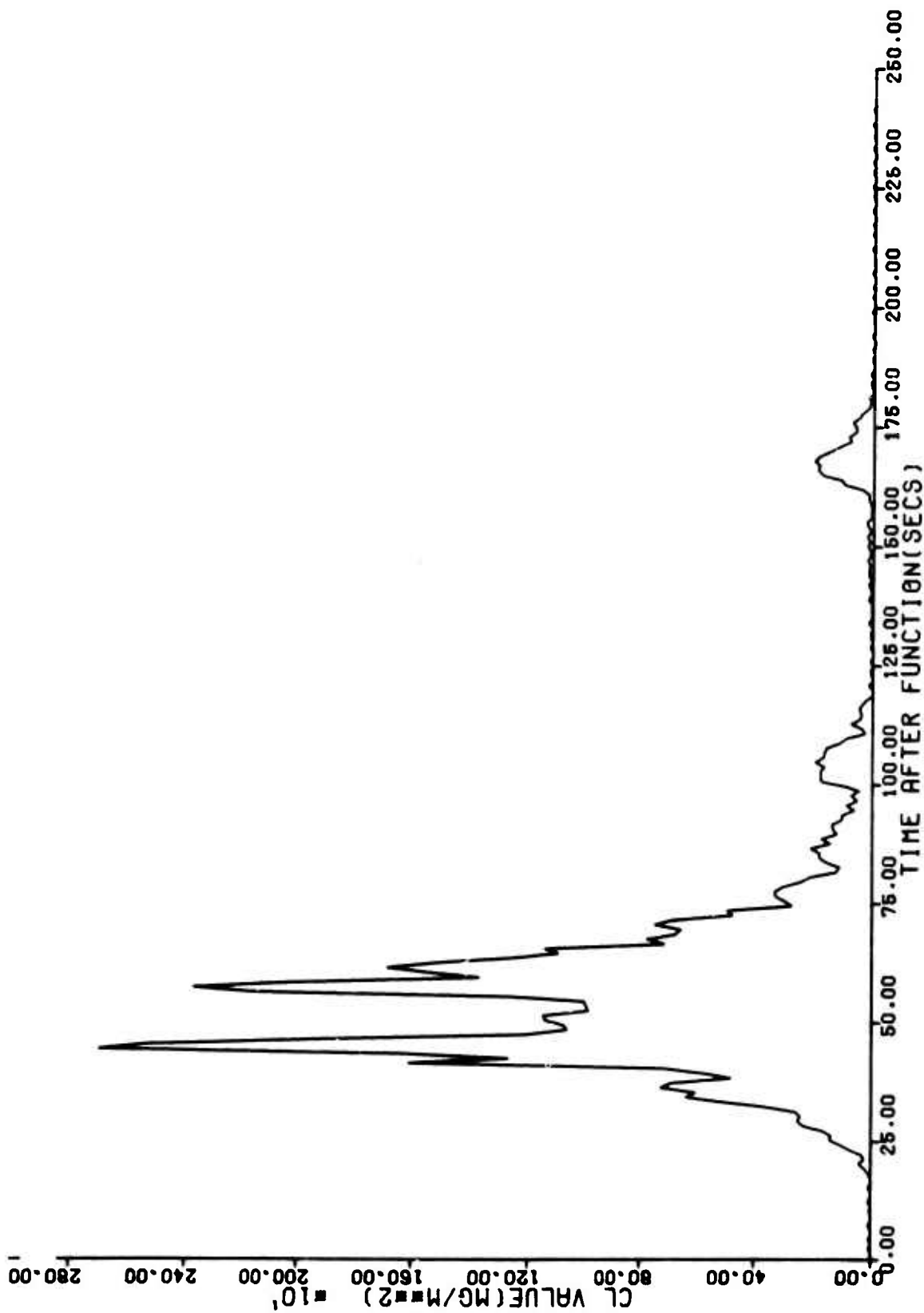
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	816
5	1640
10	1640
15	1300
20	1300
25	1300
30	1300
35	1300
40	1300
45	1300

Viewing azimuth 240° except 255° at 0 degrees elevation

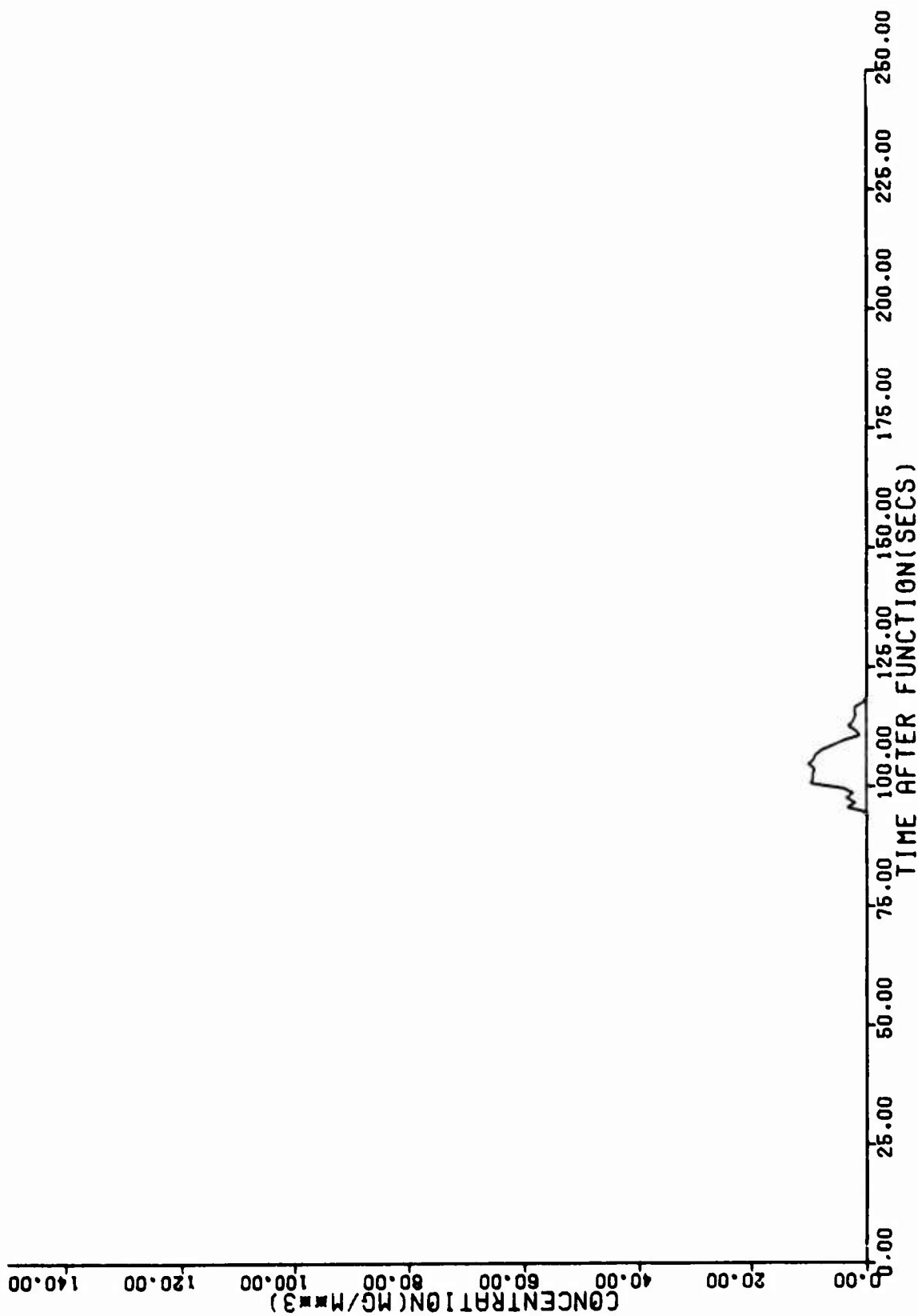


TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE



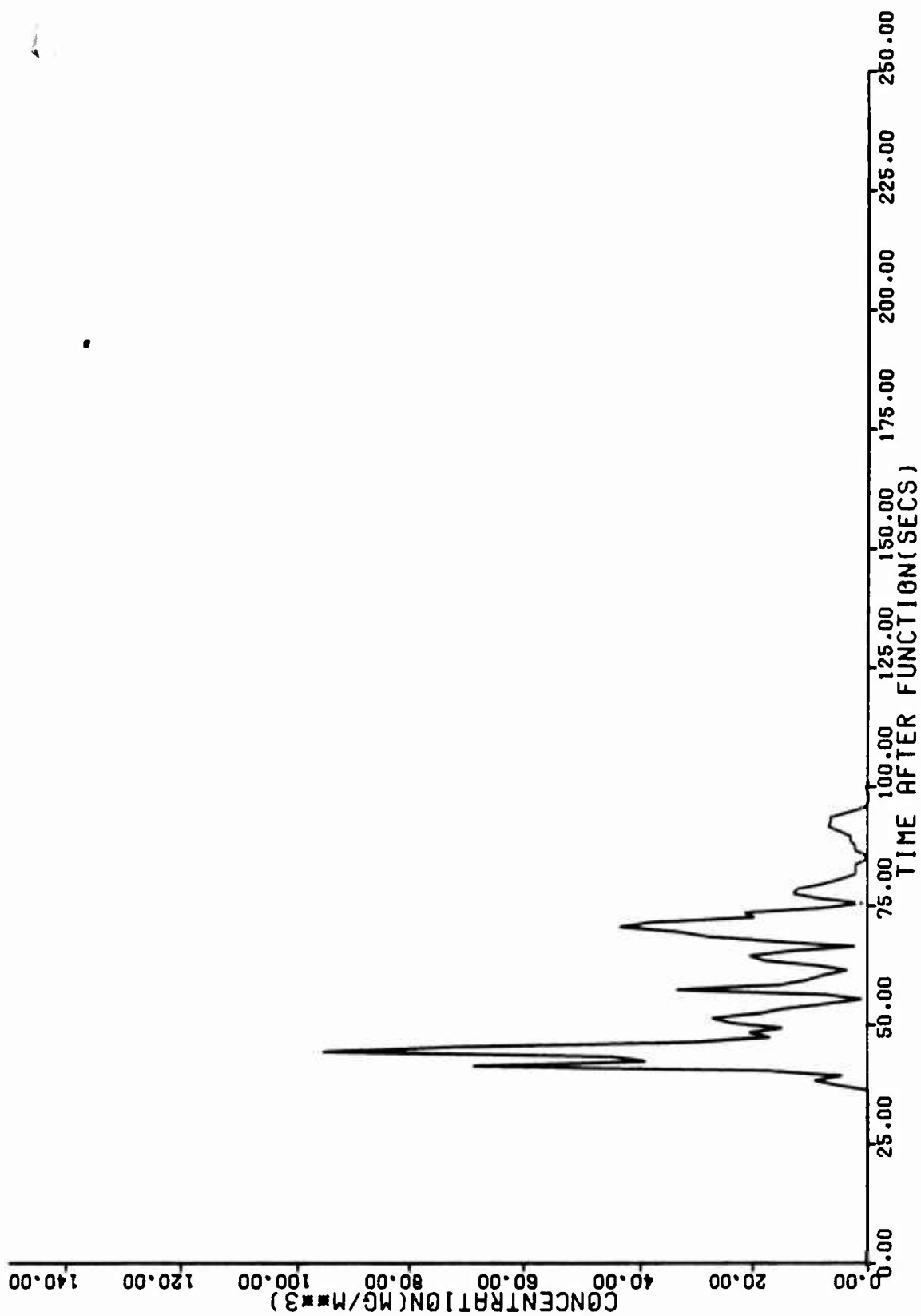
TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



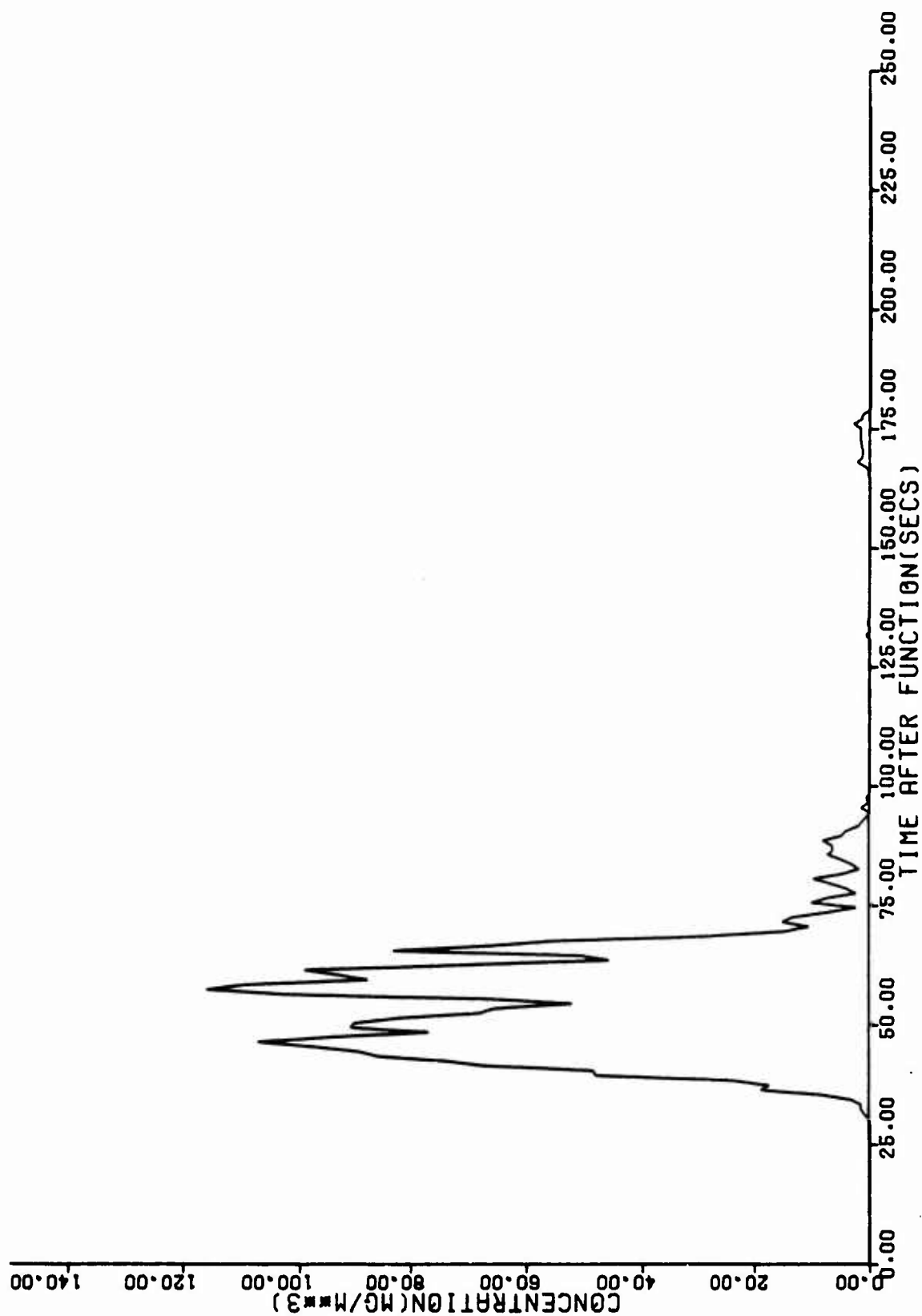
TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



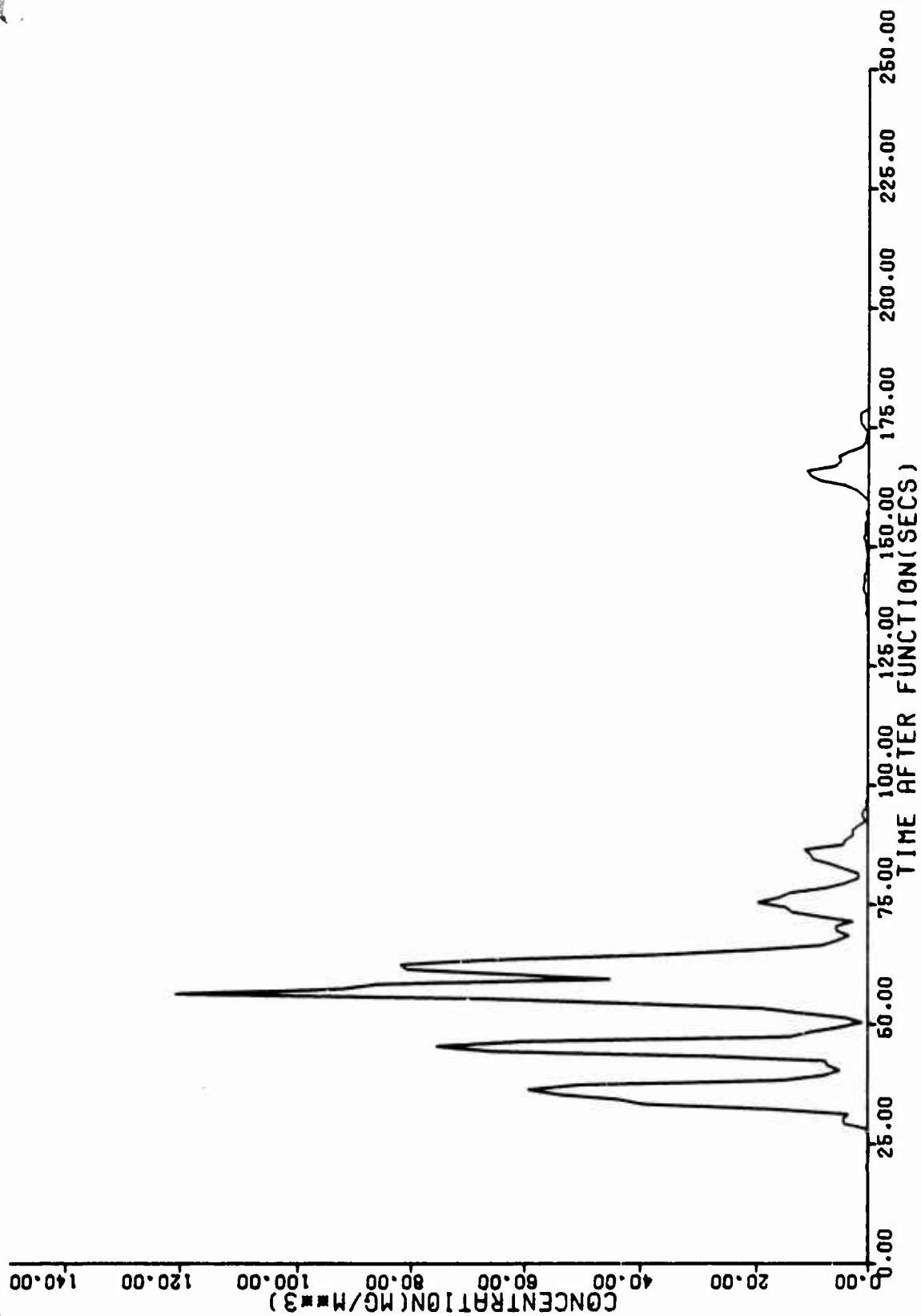
TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



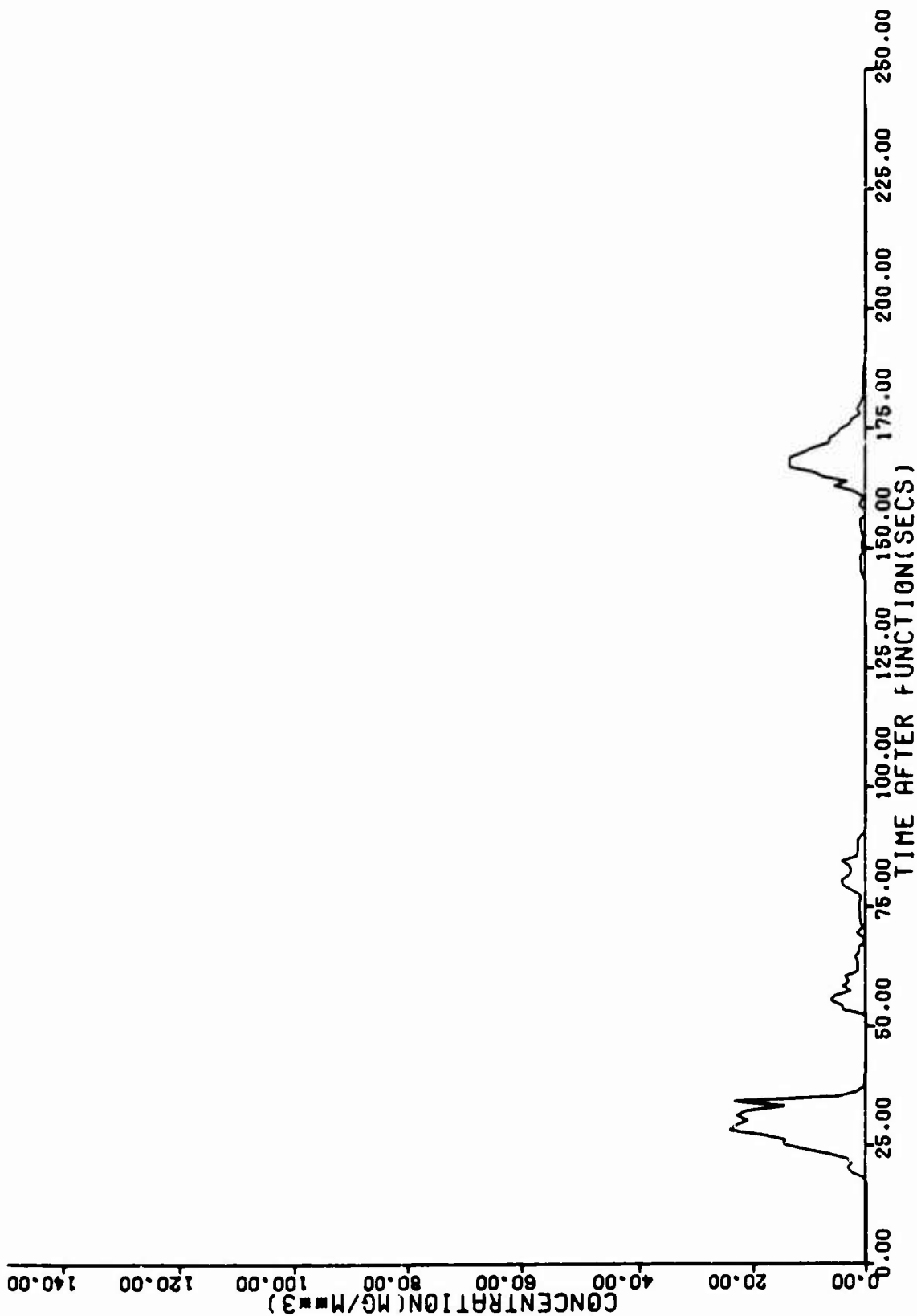
TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

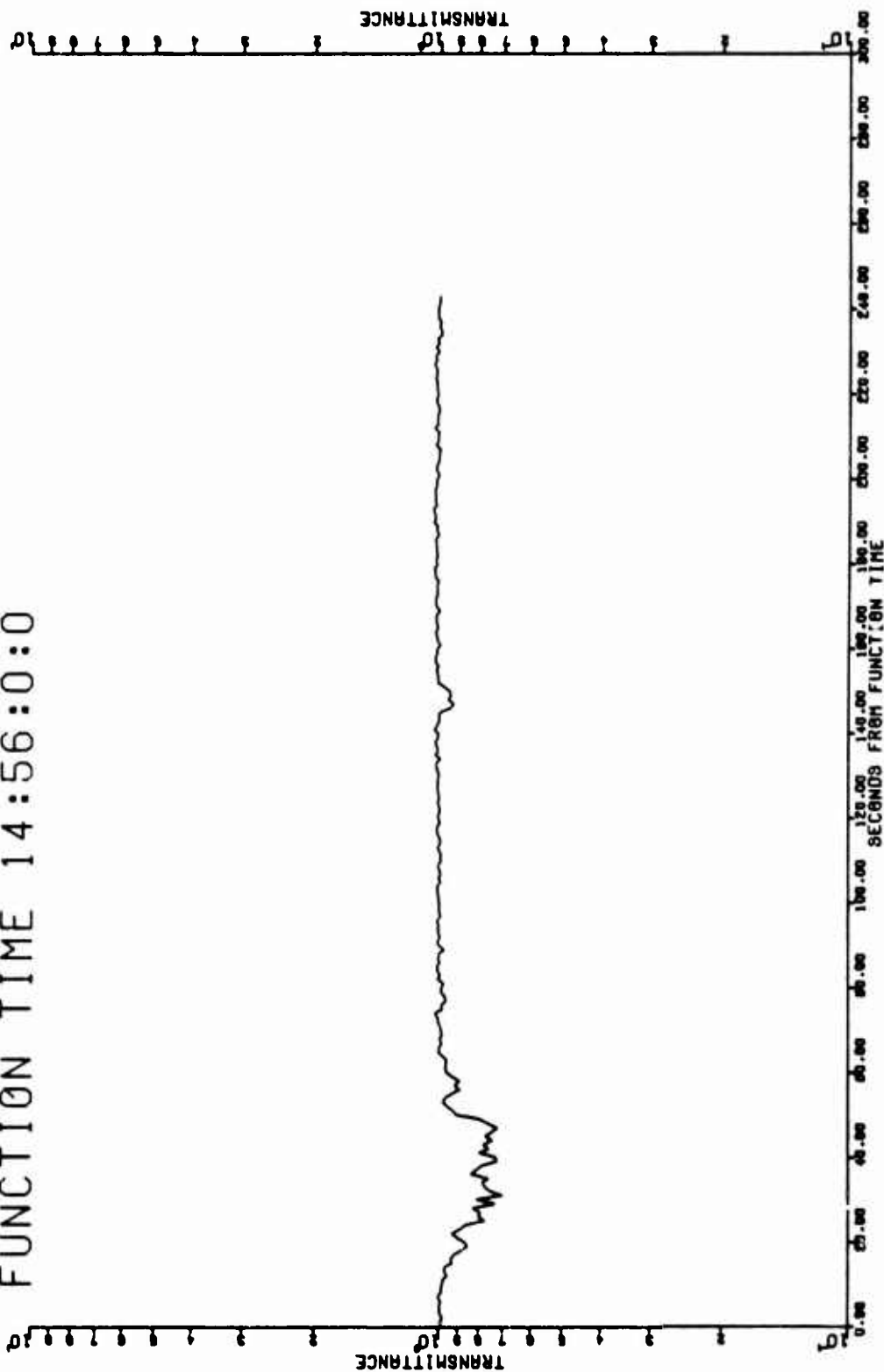
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



TRIAL 1R1(DP-1002), 27 OCT 1977, 14:56:00, HC SMOKE

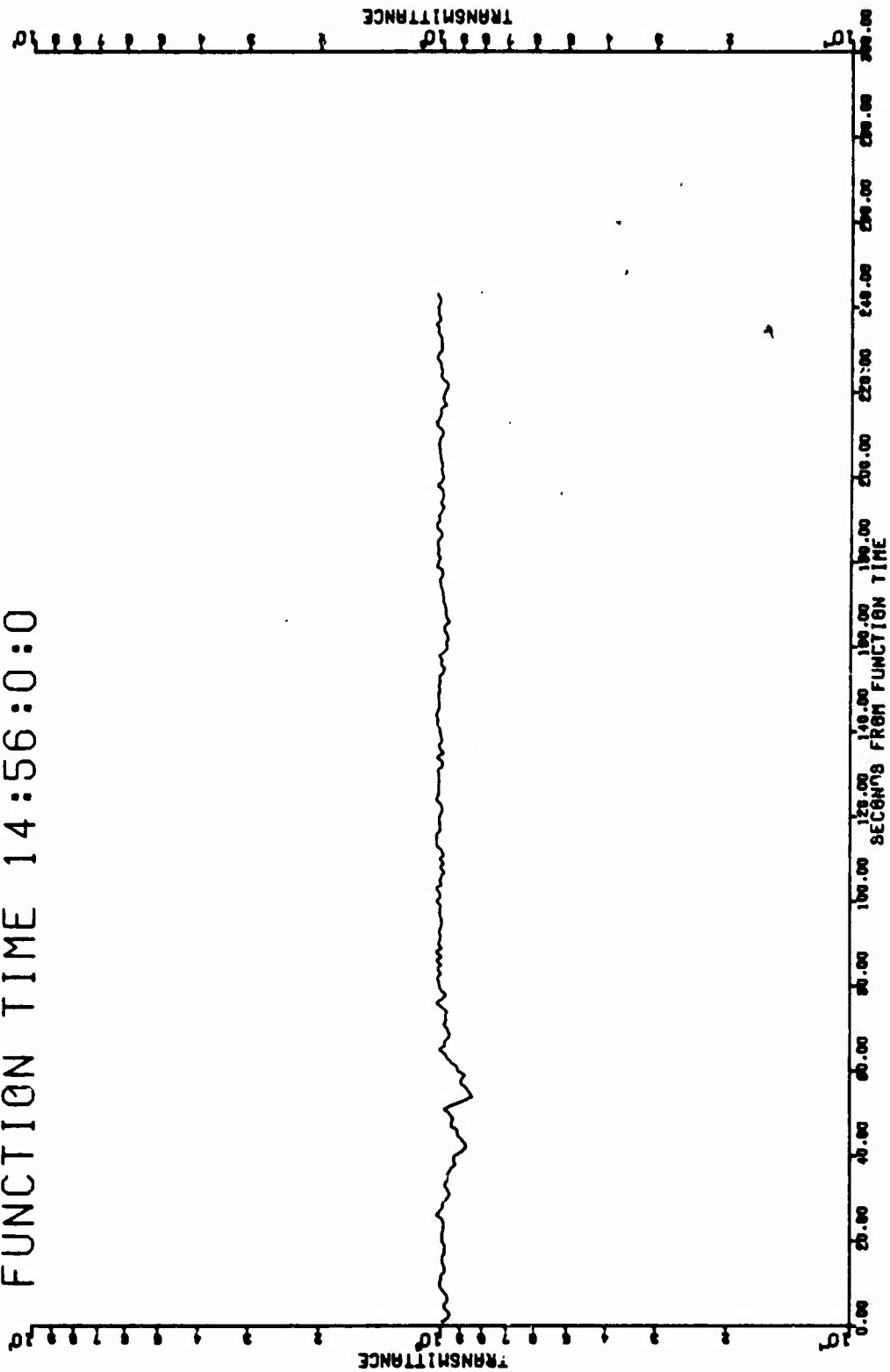
PEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



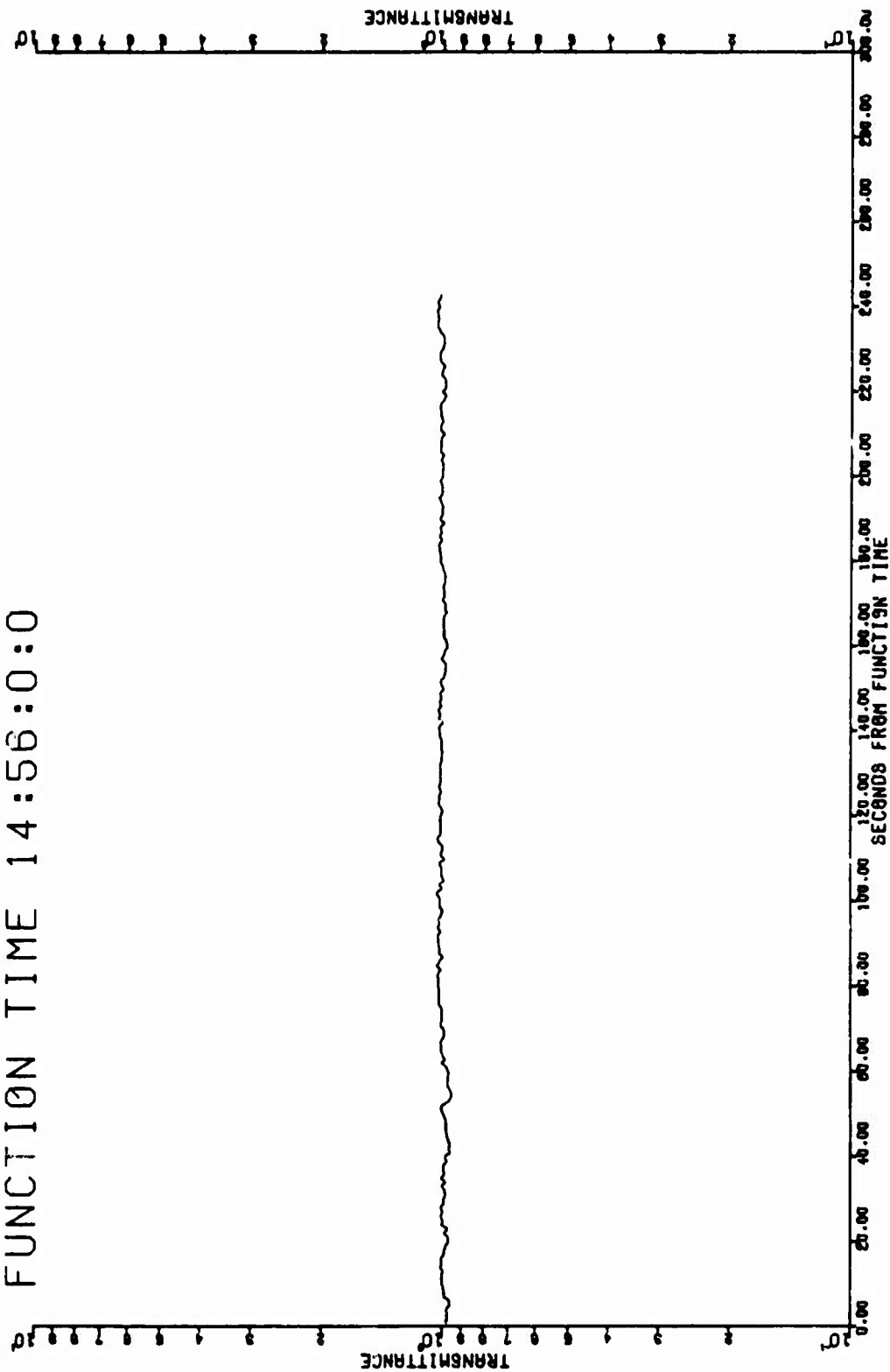
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



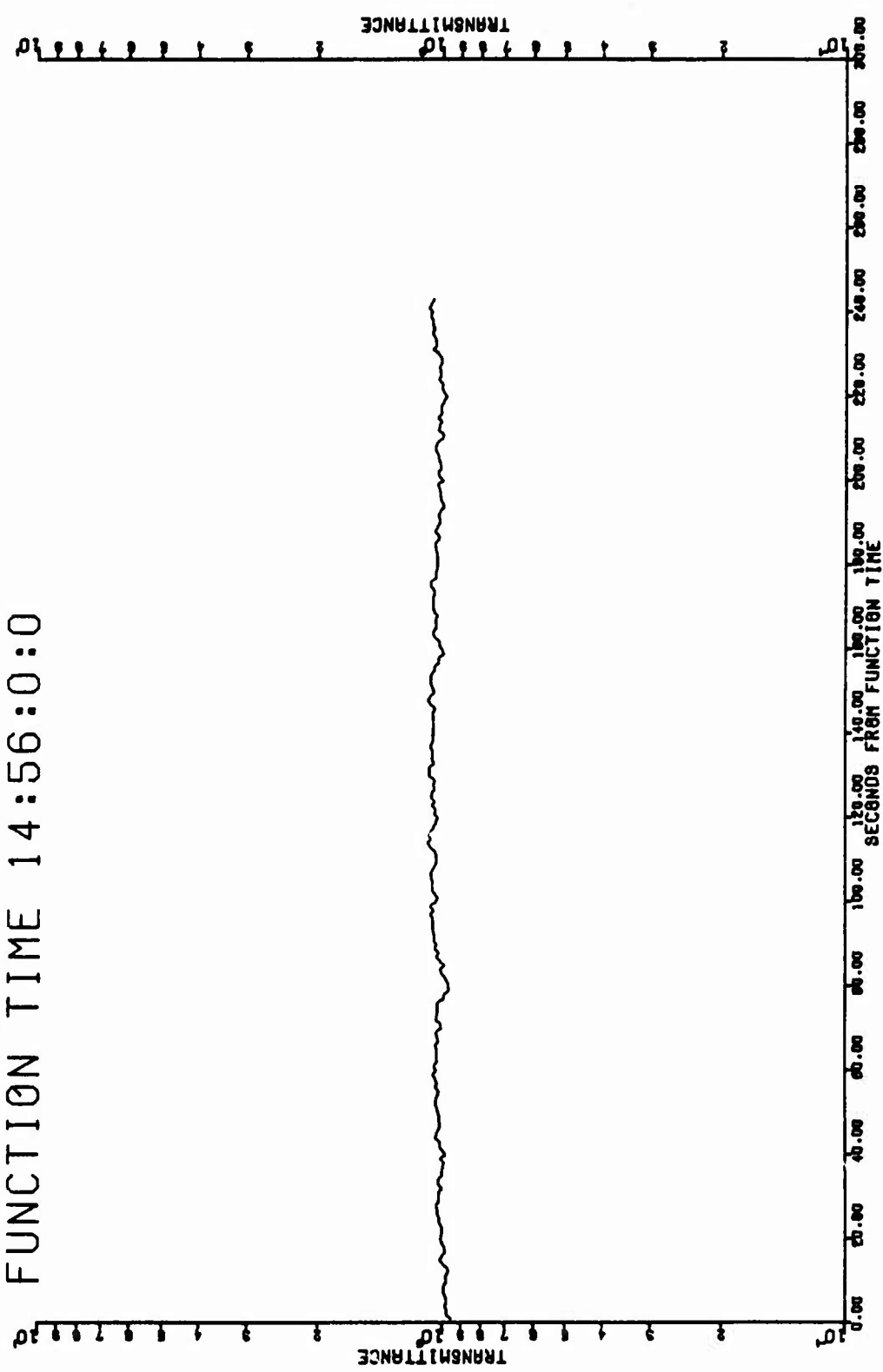
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



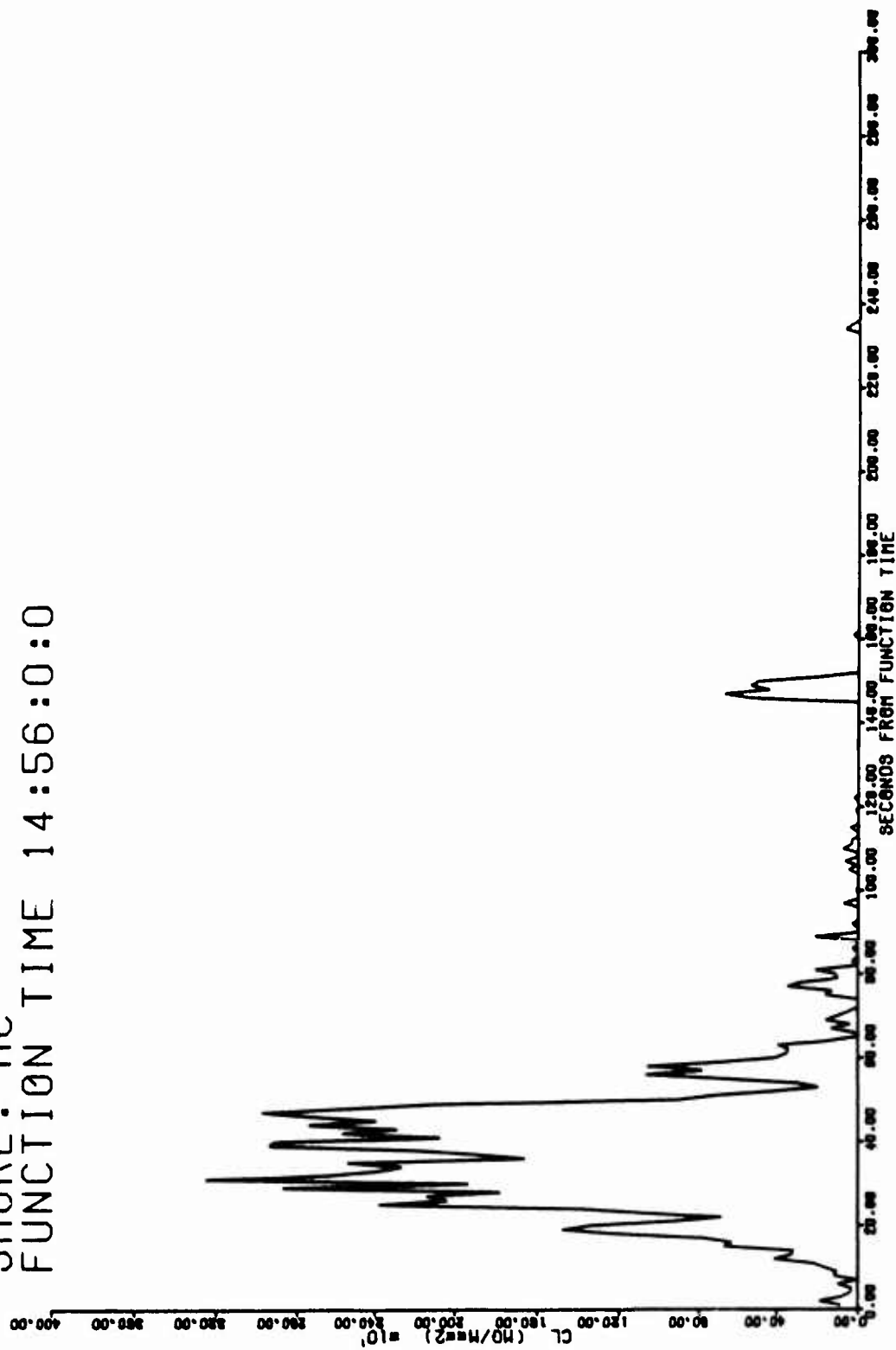
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



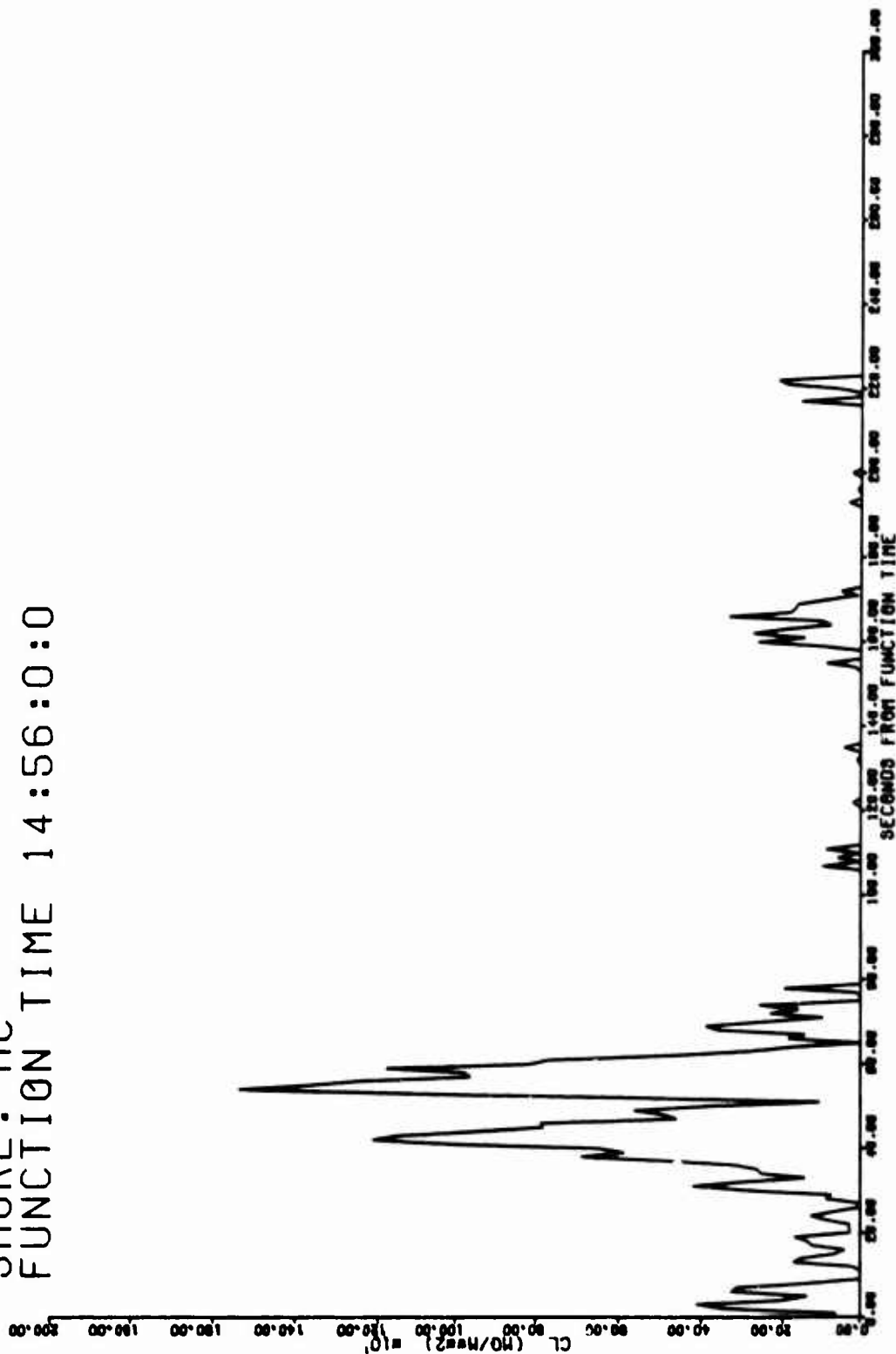
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #1 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:56:0:0



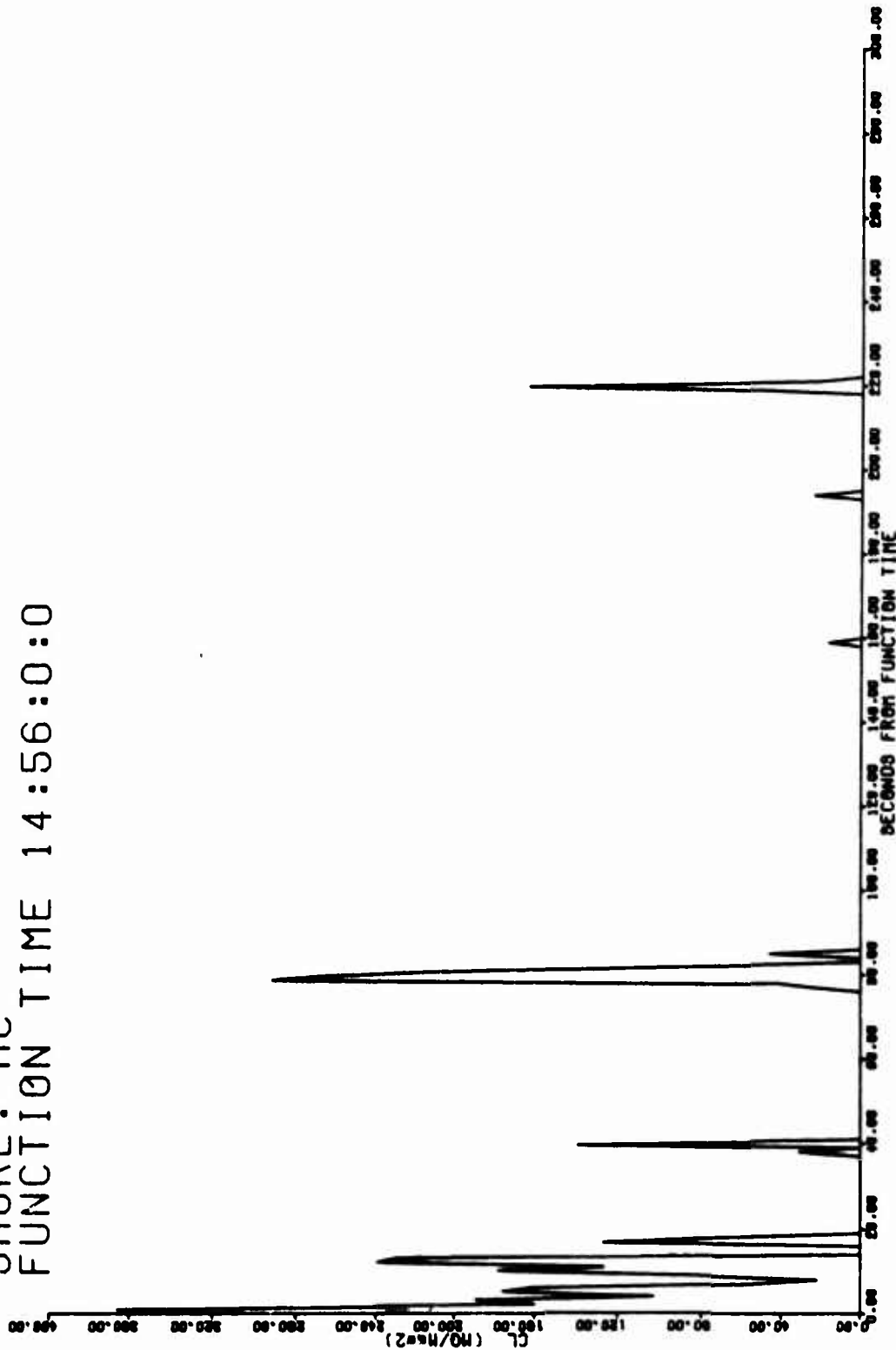
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #1 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:56:0:0



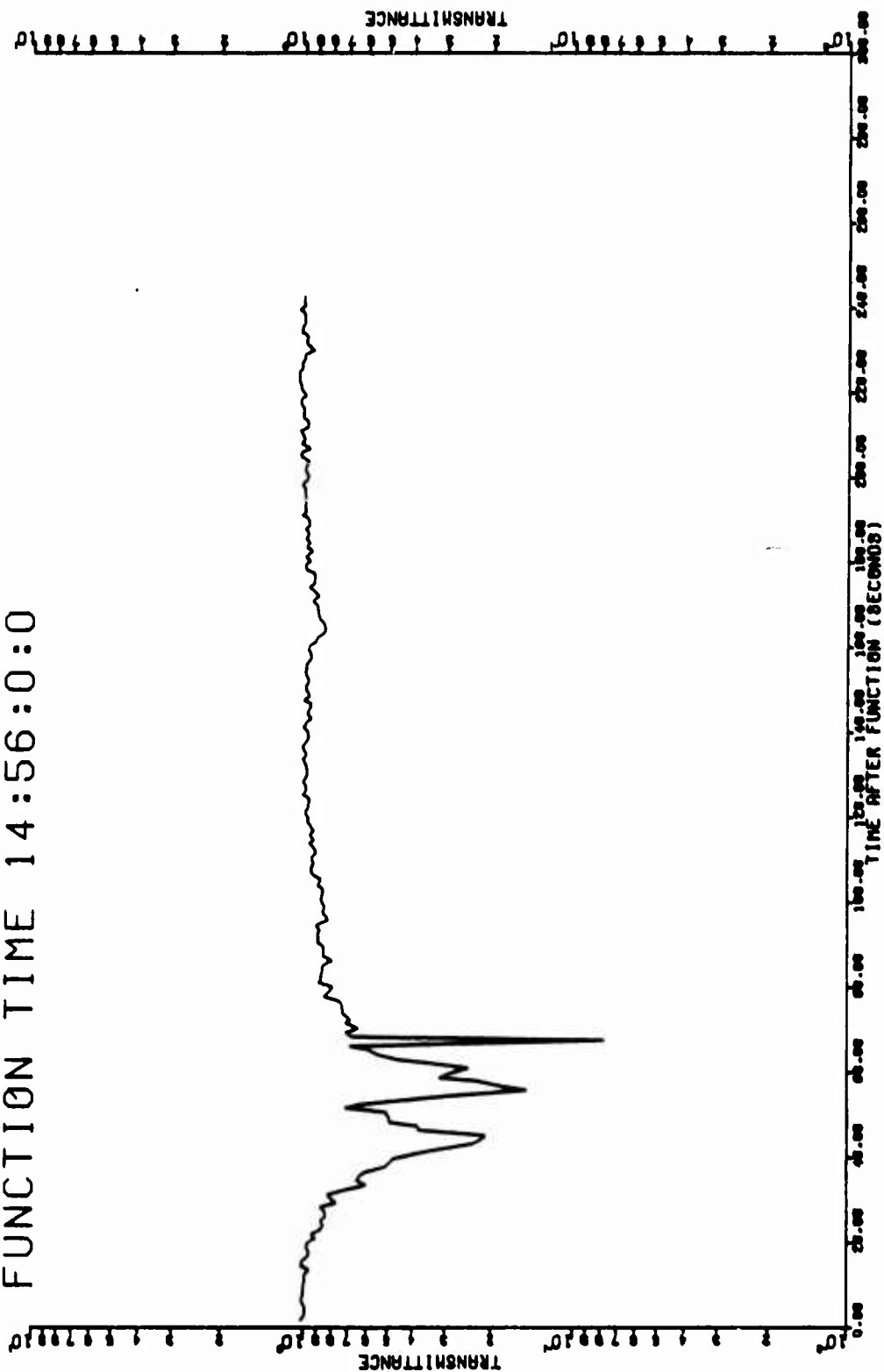
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #1 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:56:0:0



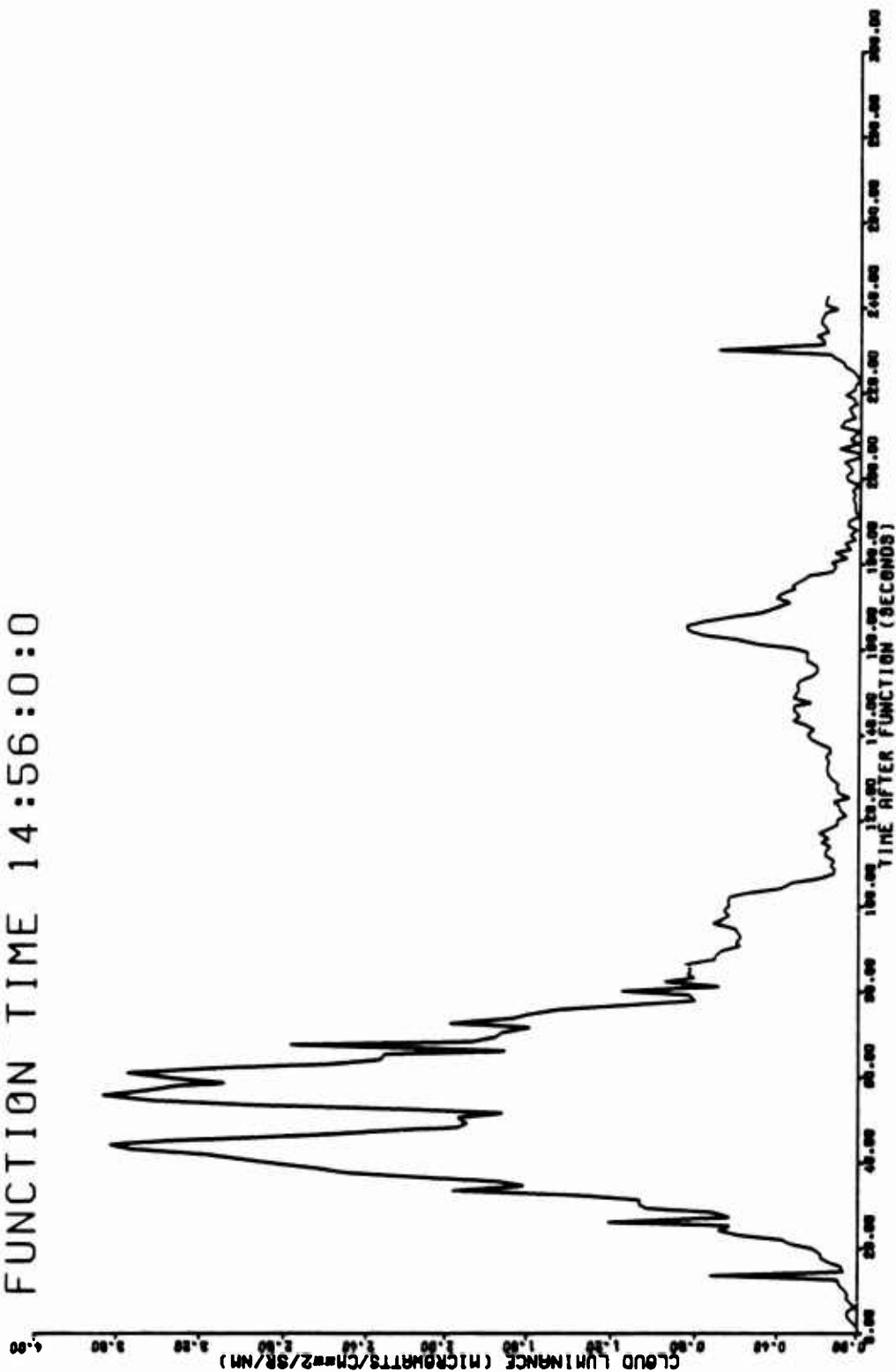
CL VALUES VERSUS TIME FOR ROW G
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



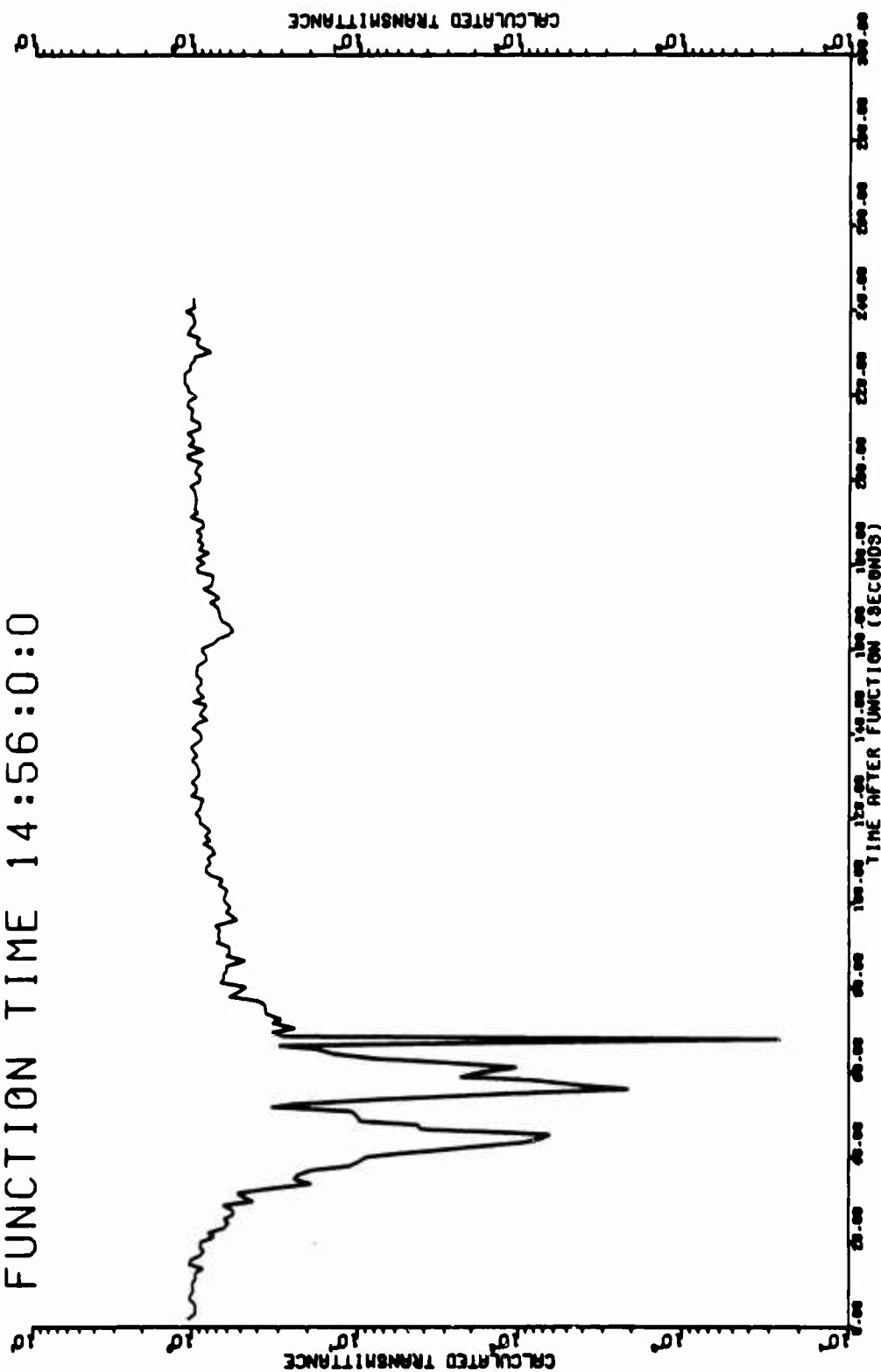
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



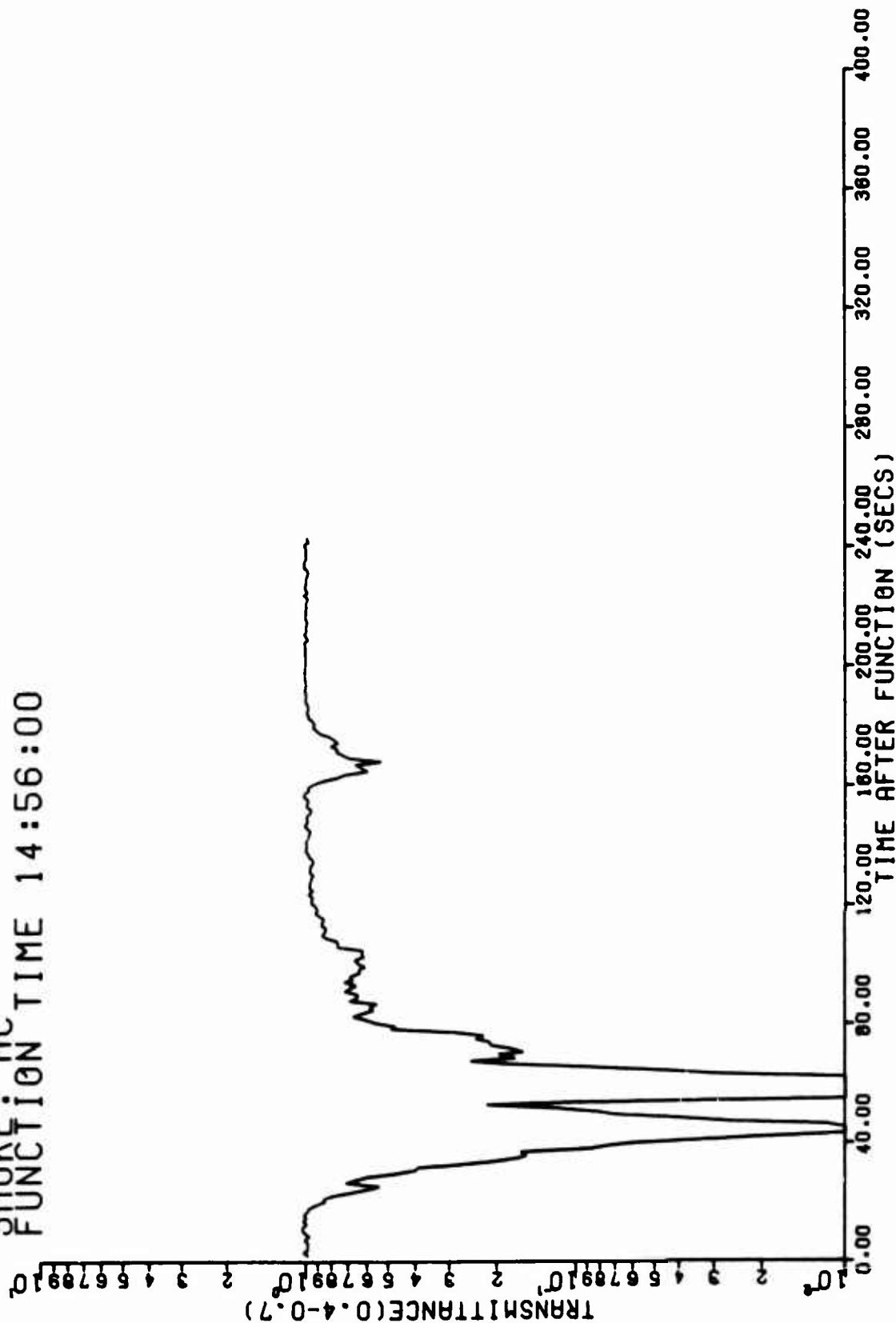
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #1 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:0:0



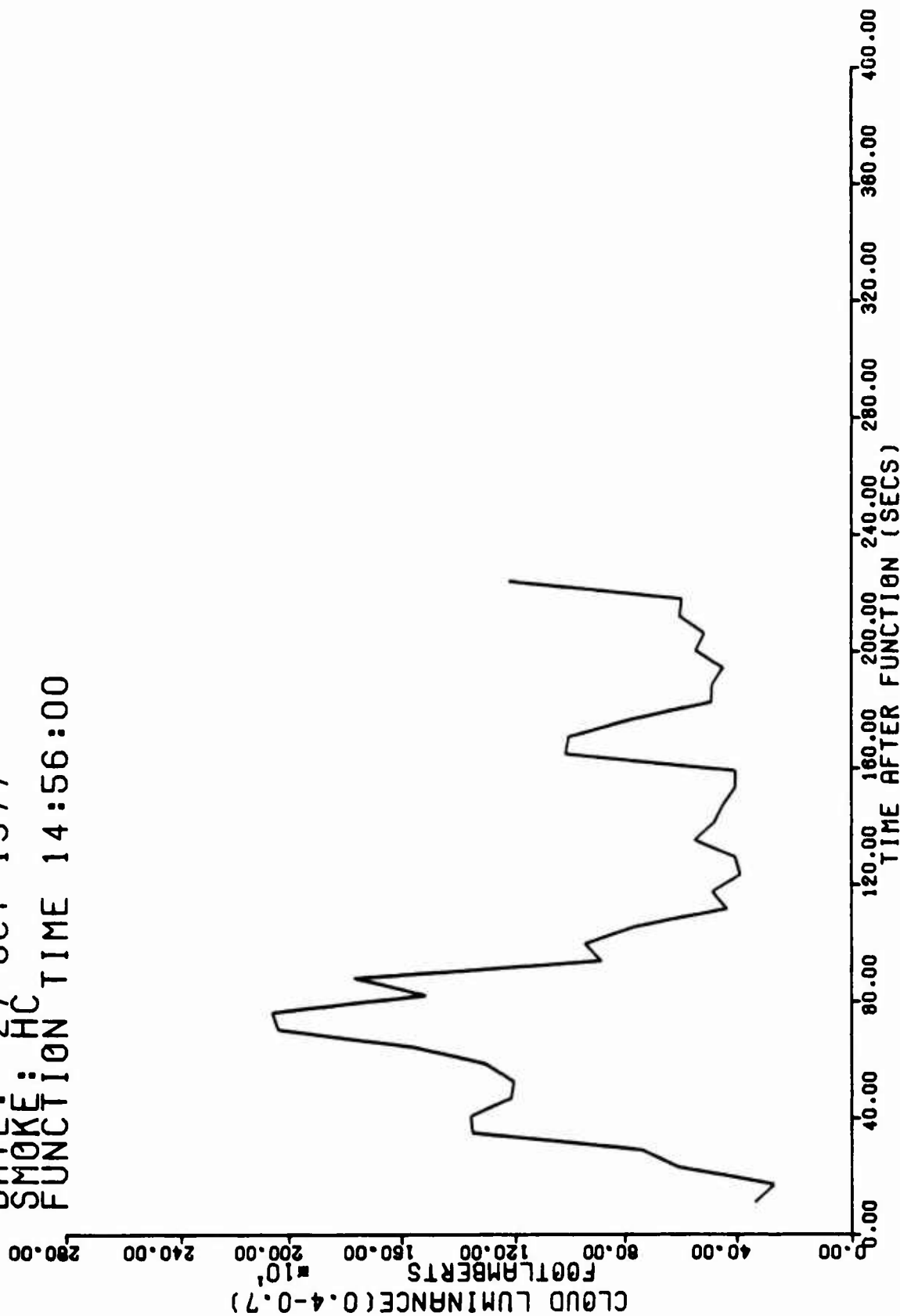
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 1R1.(DP-1002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 14:56:00



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 1R1.(DP-1002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:56:00



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

APPENDIX B-I-2

TRIAL DP1-002-T-2 (HC SMOKE) 27 OCT 1977

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SUMMARY OF TEST DAY DATA

Trial: 2

Date: 27 Oct 77

Time: 1224:00 MDT

Wind Direction (Transport) (degrees) (4m)	152
Mean Wind Speed (Transport) (\bar{u} , m/sec)	8.8
Temperature at 2-meters, Trial Time (T, °C)	21.9
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	8.2
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	4.3
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.5
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.13
Pasquill Stability Category	D
Relative Humidity (percent) (2m)	25
Solar Azimuth (deg)	164.2
Solar Altitude (deg)	35.5
Air Density - ρ (kg m ⁻³)	1.018
Solar Radiation (Langleys per minute)	0.903
Barometric Pressure (millibars)	864.6
Visibility (km)	38
Reflectivity, OD Target	NA
Haze (footlamberts)	551
Brightness, Background (footlamberts)	850
Brightness, White Target (footlamberts)	1448
Brightness, OD Target	350
Percent Opaque Cloud Cover	2

Munitions/Submunitions Used (HC, 105mm)	9
Number of Munitions/Submunitions Functioned	8
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.24
(0.4 - 0.6) . . . . .	.21
(0.6 - 0.8) . . . . .	.17
(0.8 - 1.0) . . . . .	.14
(1.0 - 1.5) . . . . .	.15
(1.5 - 3.0) . . . . .	.09
$\text{Log}_{10}\text{NMD}$	-.19350
$\sigma\text{Log}_{10}\text{NMD}$ . . . . .	.26739
NMD . . . . .	.64
MMD . . . . .	.94

Initial Cloud Dimensions (Meters)

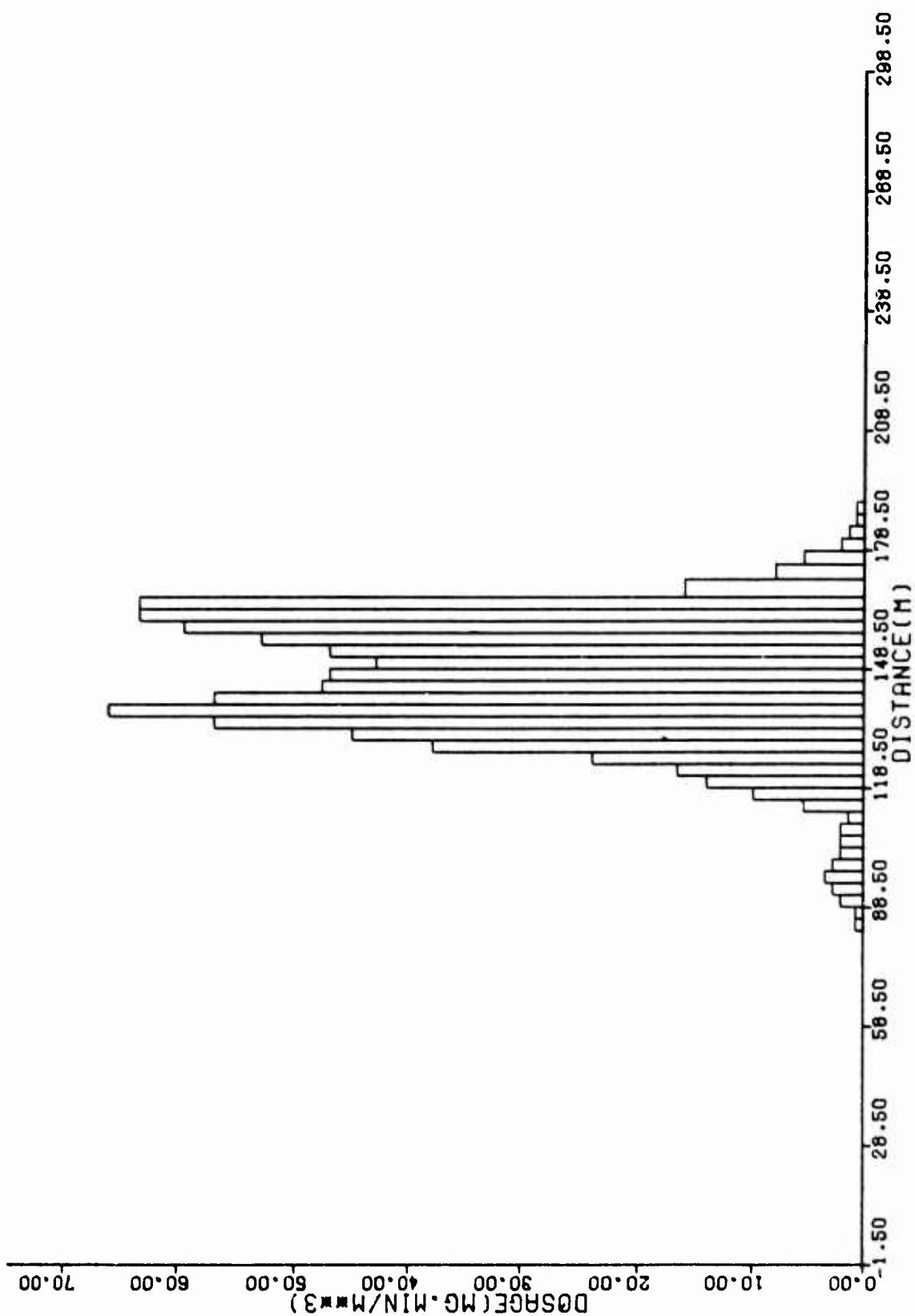
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1224:00	2	49	1
1224:10	53	51	3
1224:20	99	64	7
1224:30	108	85	14
1224:40	177	86	16
1224:50	292	89	19
1225:00	385	89	40
1225:10	359	102	29
1225:20	207	137	27
1225:30	54	178	4

SKY BRIGHTNESS

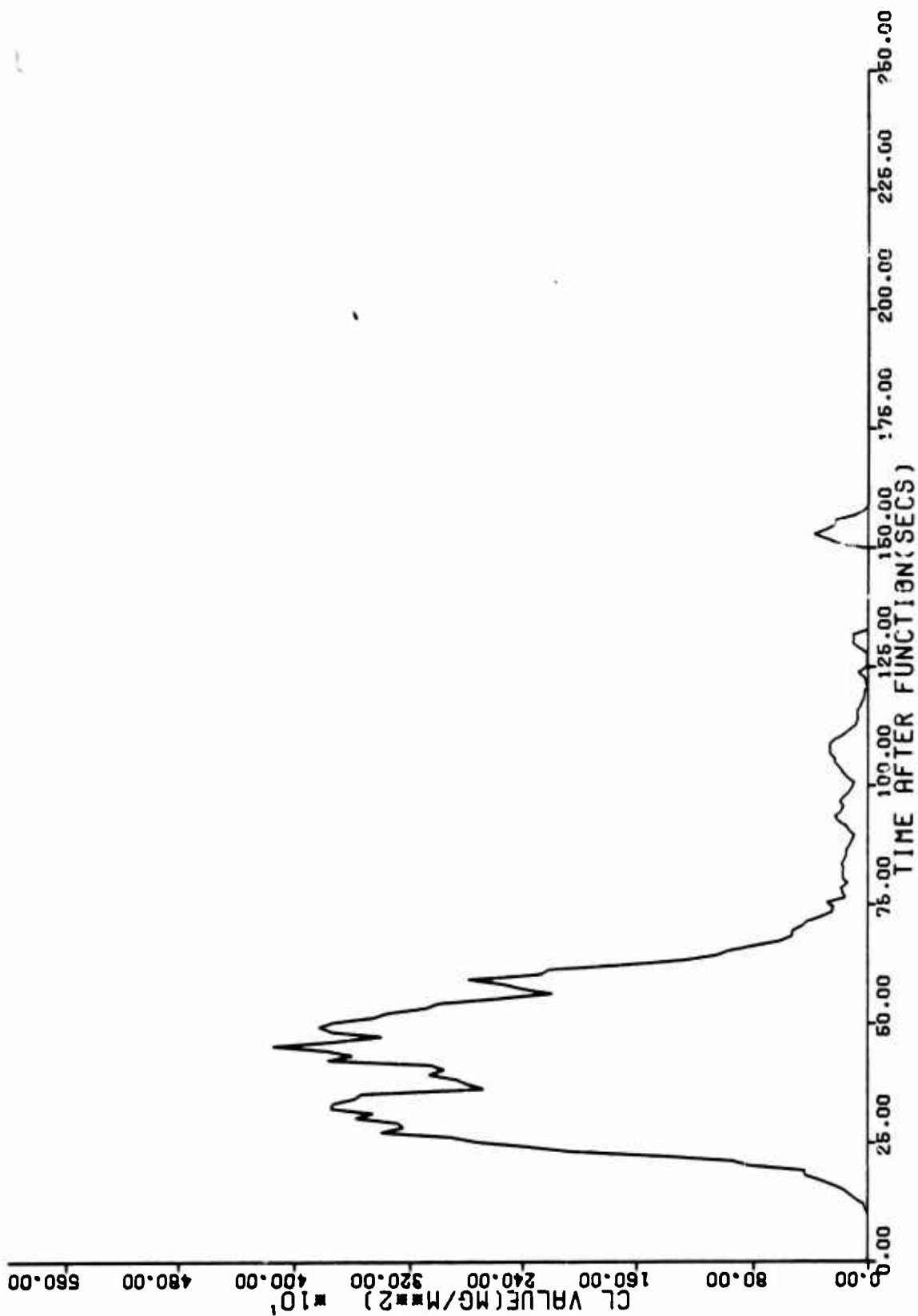
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	816
5	1640
10	1640
15	1640
20	1756
25	1756
30	1640
35	1640
40	1300
45	1300

Viewing azimuth 240° except 255° at 0 degrees elevation

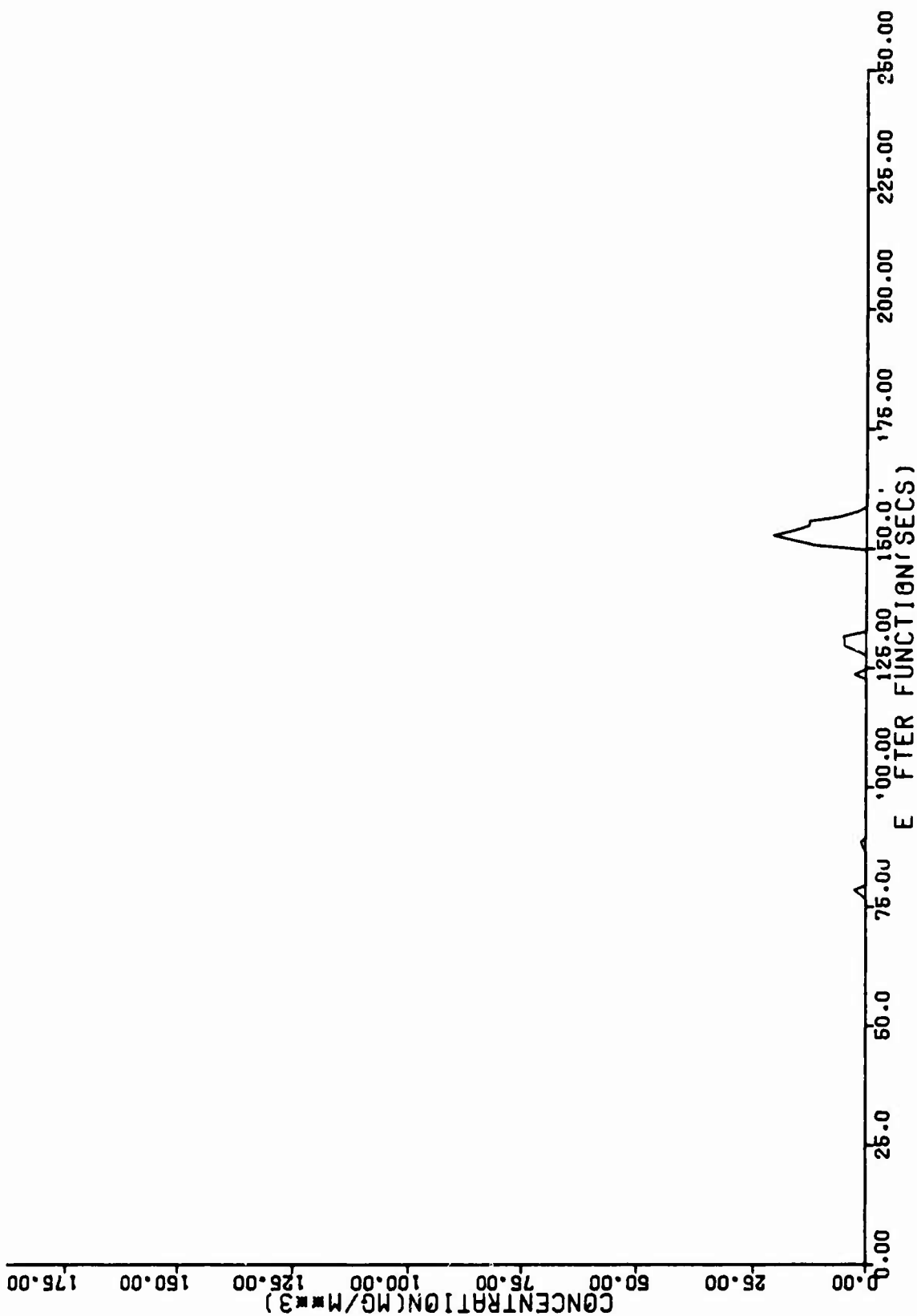


TRIAL 2 (DP-1002), 27 OCT 1977, 12:24:00, HC SMOKE



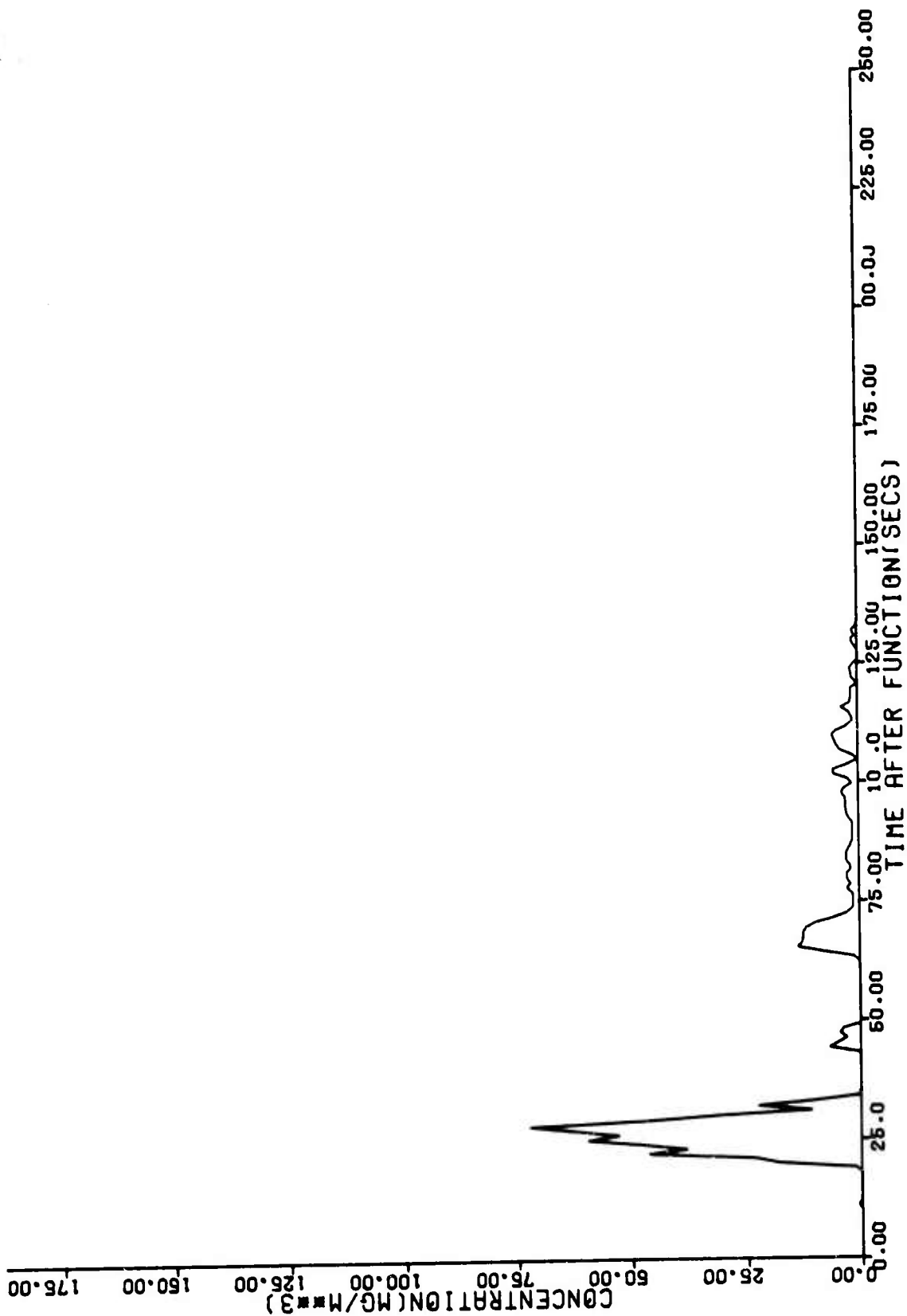
TRIAL 2 (DP-1002), 27 OCT 1977, 12:24:00, HC SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



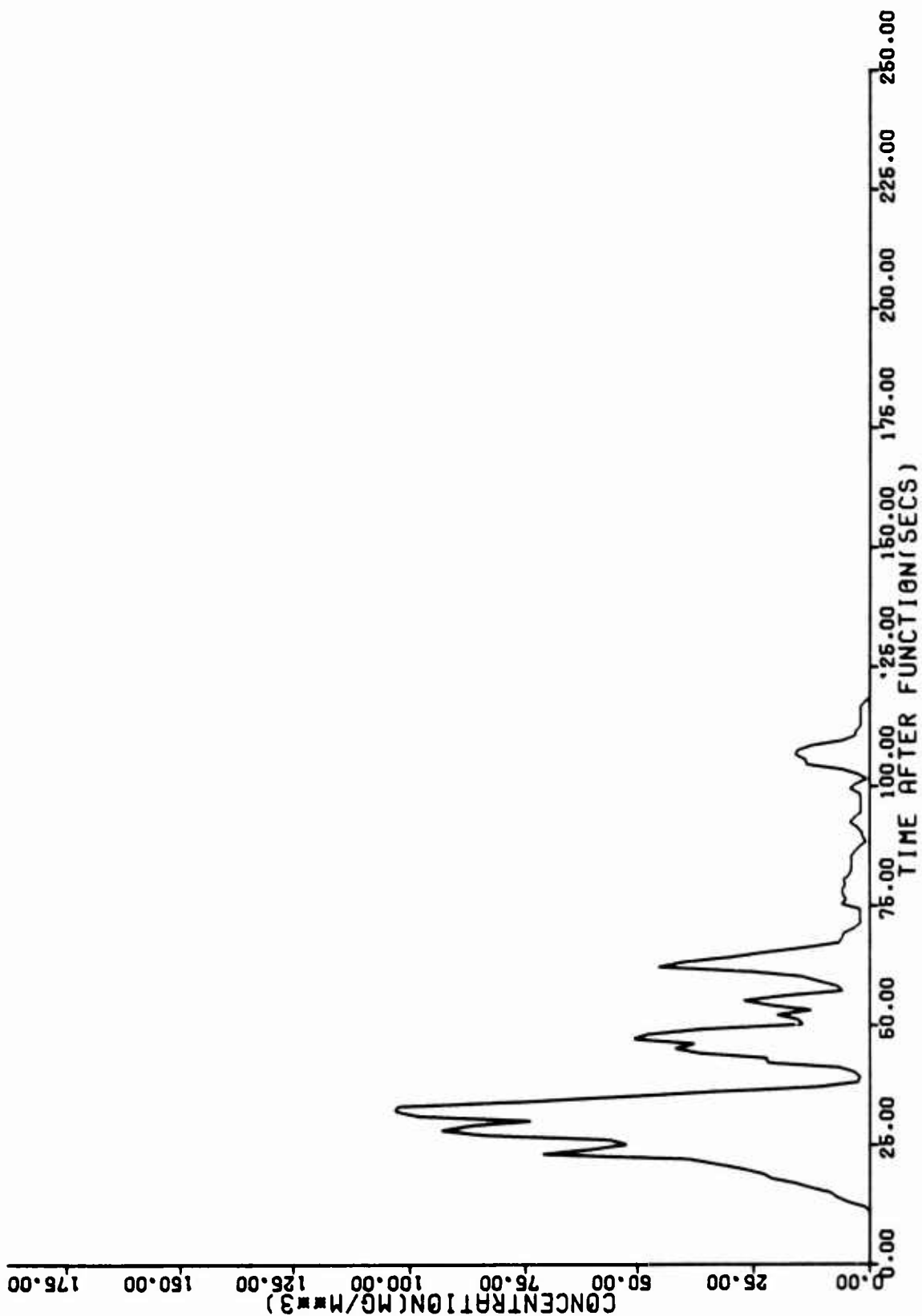
TRIAL 2 P-1 1J2), 27 OCT 1977, 12:24:00, HC SMOKE

AEROSOL PHOTOMETER 6, X=0.00, Y=1 12.00, Z=0.00



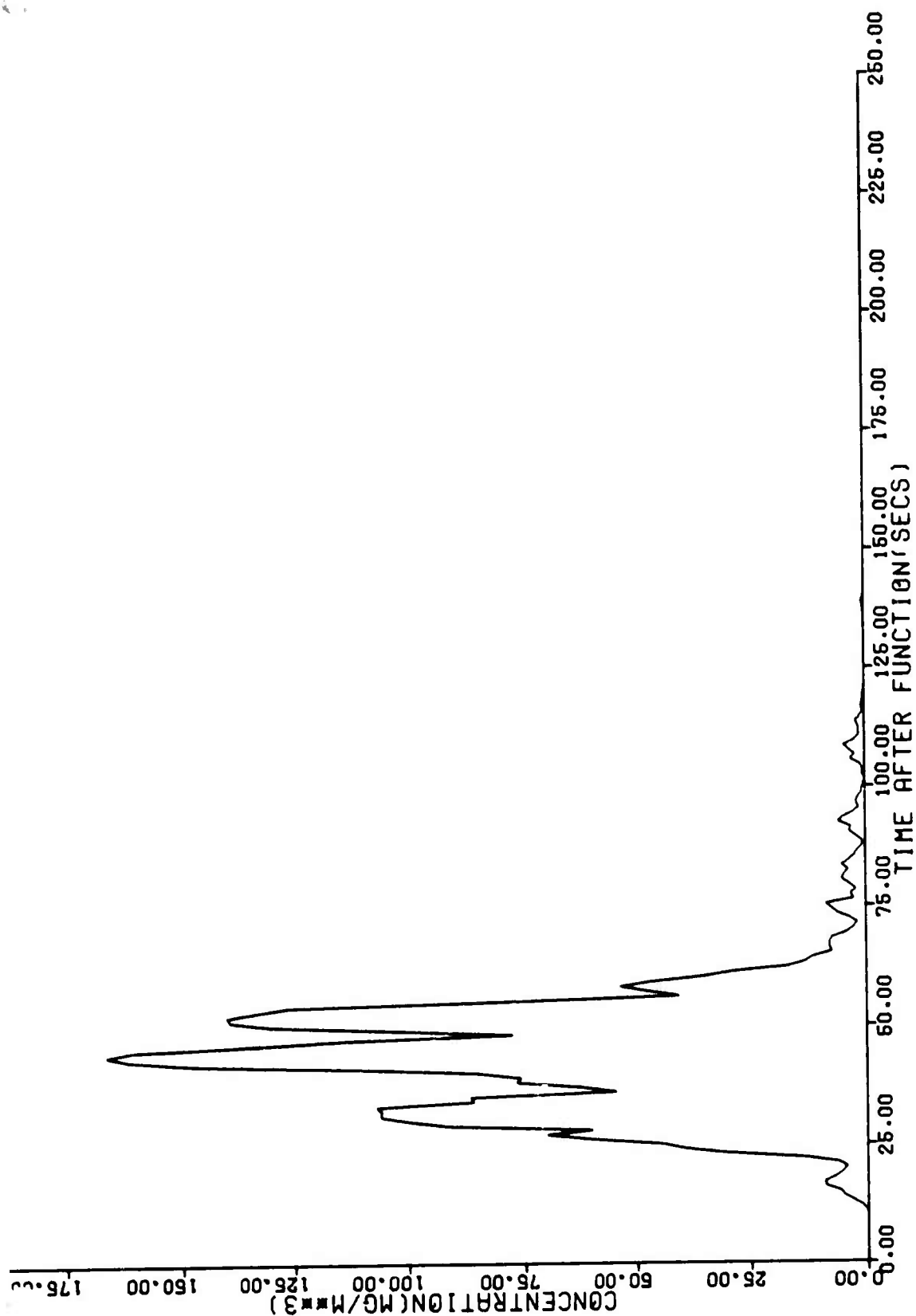
TRIAL 2 (DP 1002), 2' OCT '3 , 2:24:00, H S OKE

AER: L PHOTOMETER # , X=0.01, Y=120.00, Z=0.00



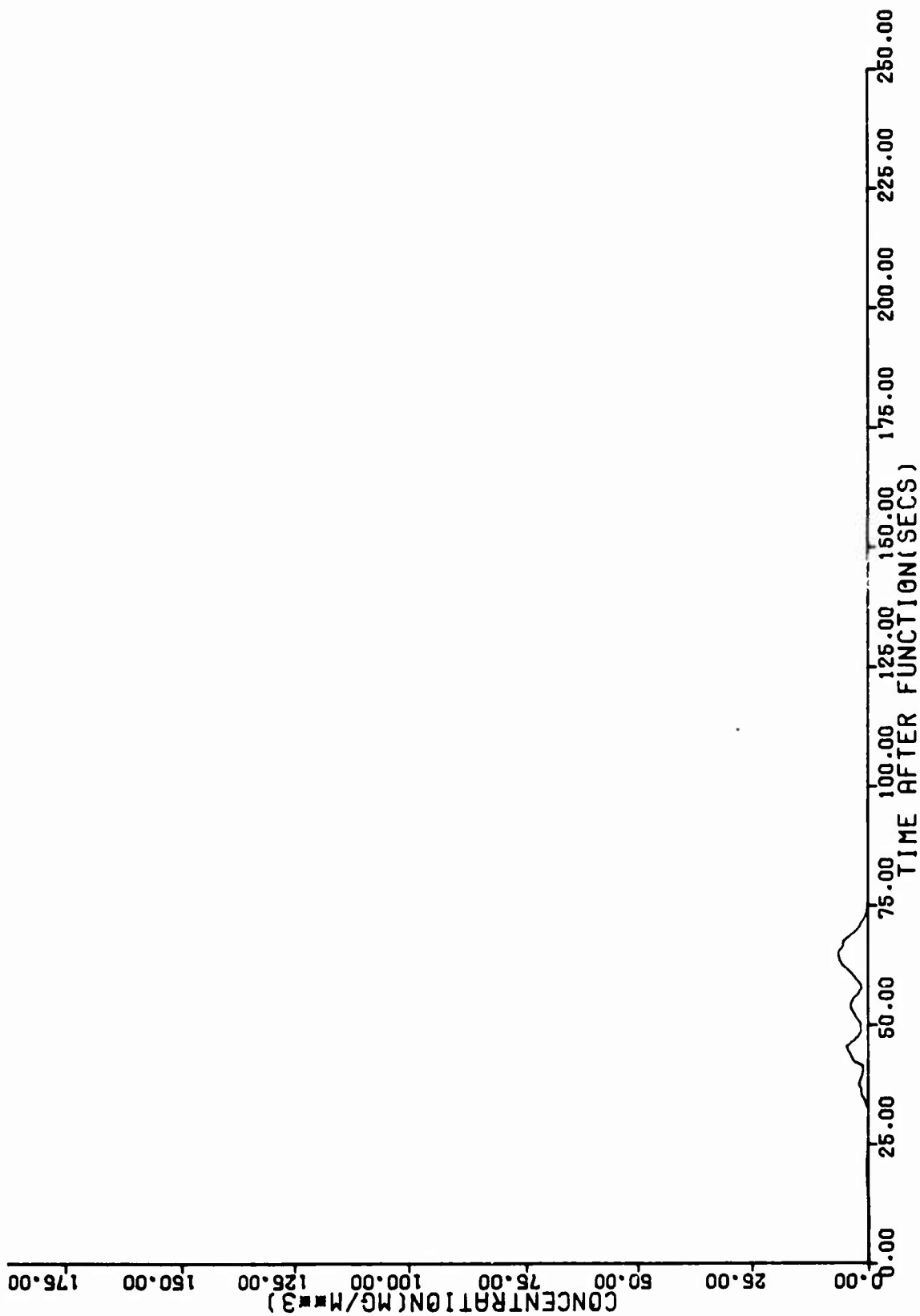
TRIAL 2 (DP-1J02), 27 OCT 1977, 12:24:00, HC SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



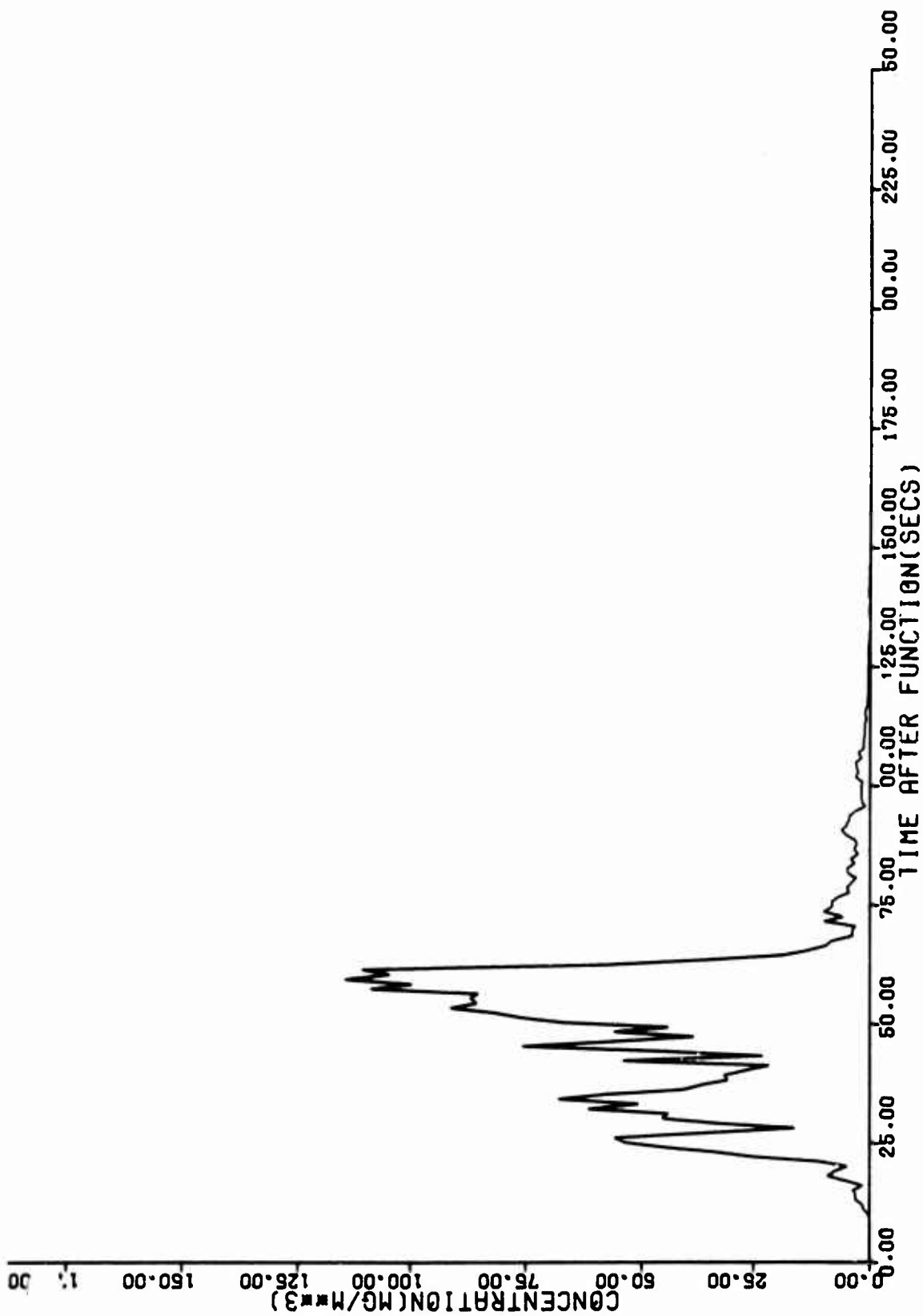
TRIAL 2 (DP 1002). 27 OCT 1977, 12:24:00, H, SMOKE

AEROSOL PHOTOMETER #9 X=0.00, Y=138.00, Z=0.00



TRIAL 2 (DP-1002), 27 OCT 1977, 12:24:00, HC SMOKE

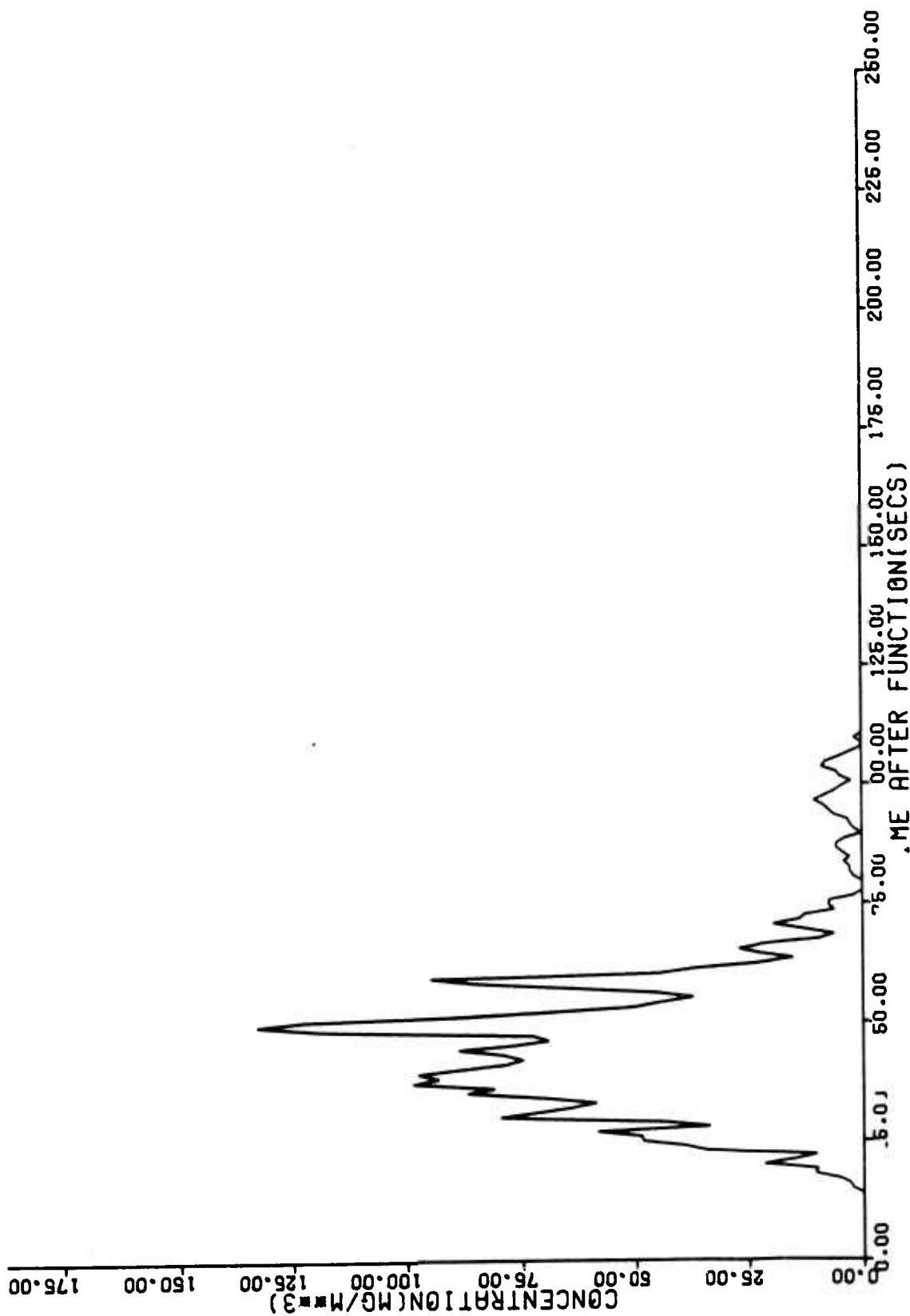
AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00



B-I-2-13

TRIAL 2 (DP-1012), 27 OCT 1977, 12:24:00, HC SMOKE

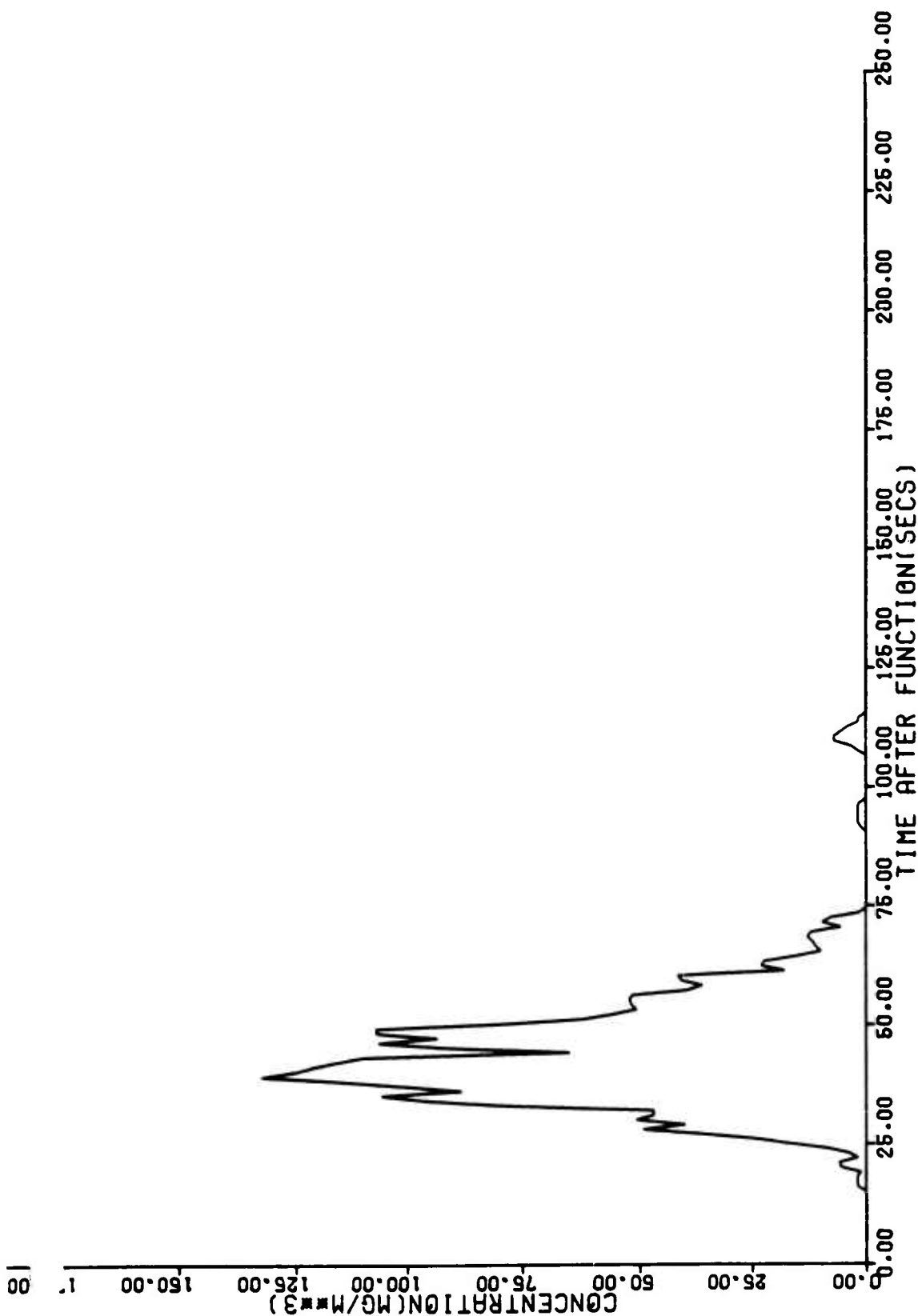
AEROSOL PHOTOMETER # U, X=0 00, Y=147.00, Z=0.00



B-I-2-14

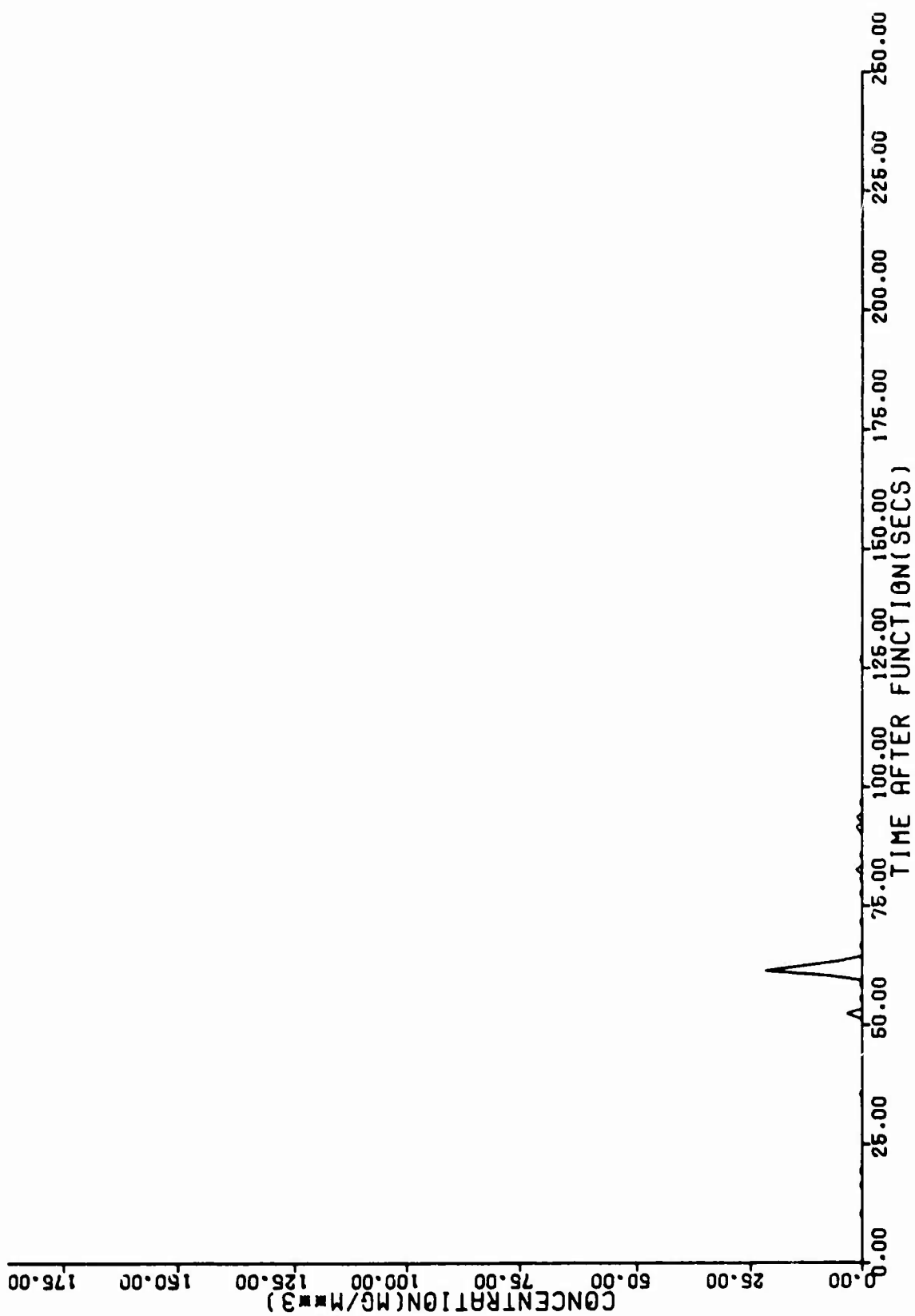
TRIAL 2 (DP-1U02), 27 OCT 1977, 12:24:00, HC S10KE

EROSOL PHOTOMETER #11 X=0.00, Y=156.00, Z=0.00



TRIAL 2 (DP-1002), 27 OCT 1J77, 12:24:00, HC SMOKE

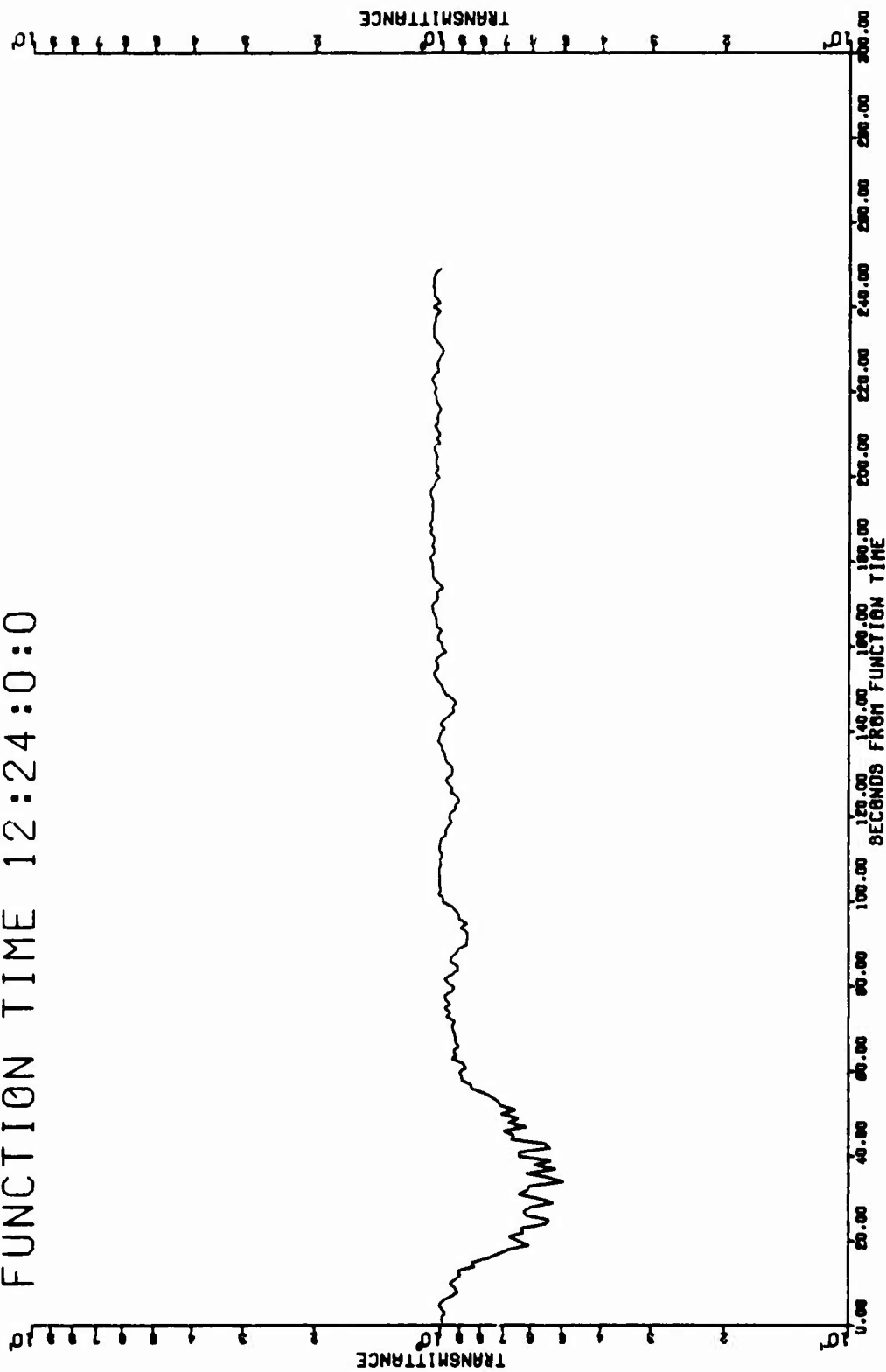
AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



TRIAL 2 (DP-1002), 27 OCT 1977, 12:24:00, HC SMOKE

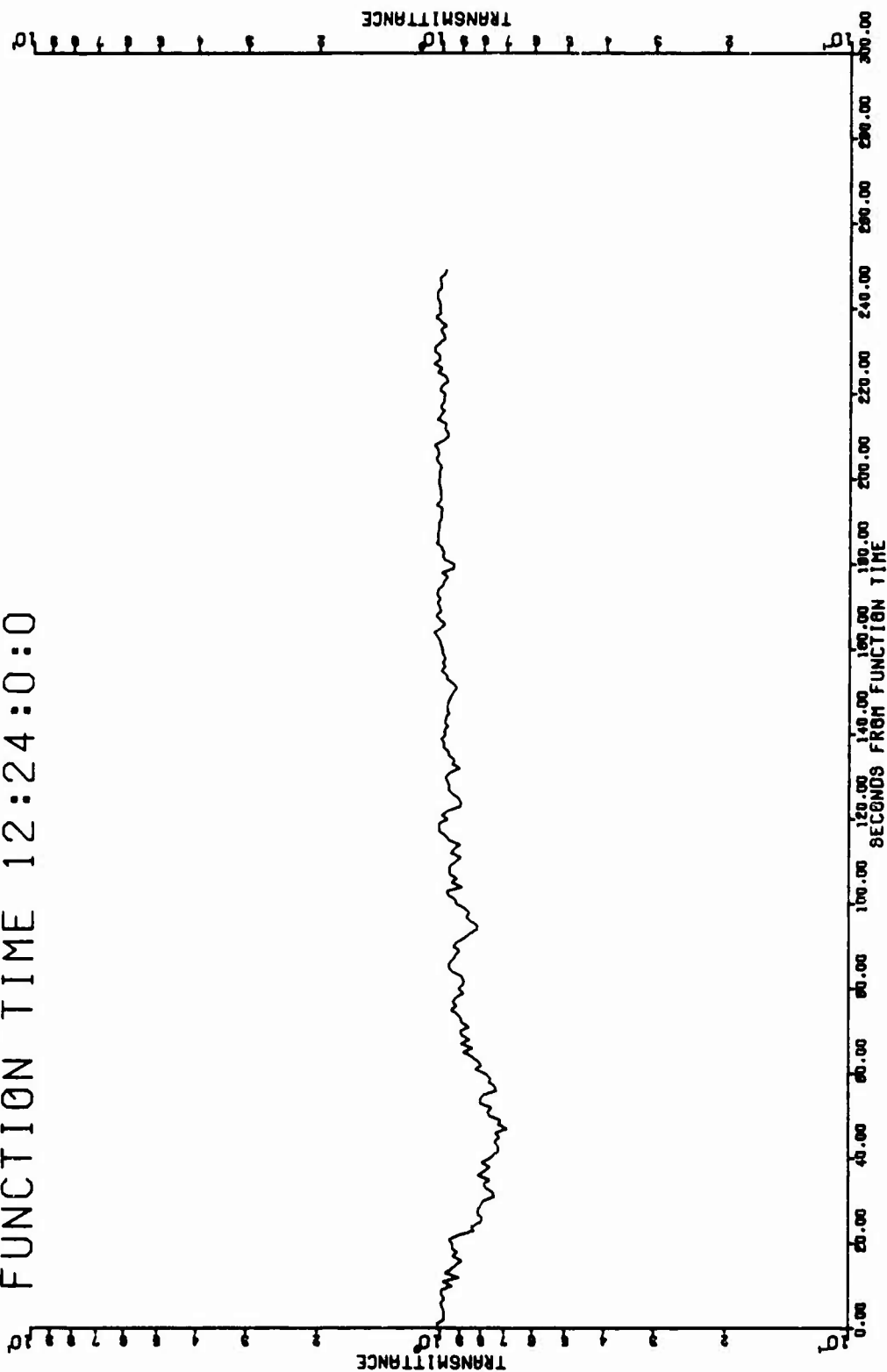
AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



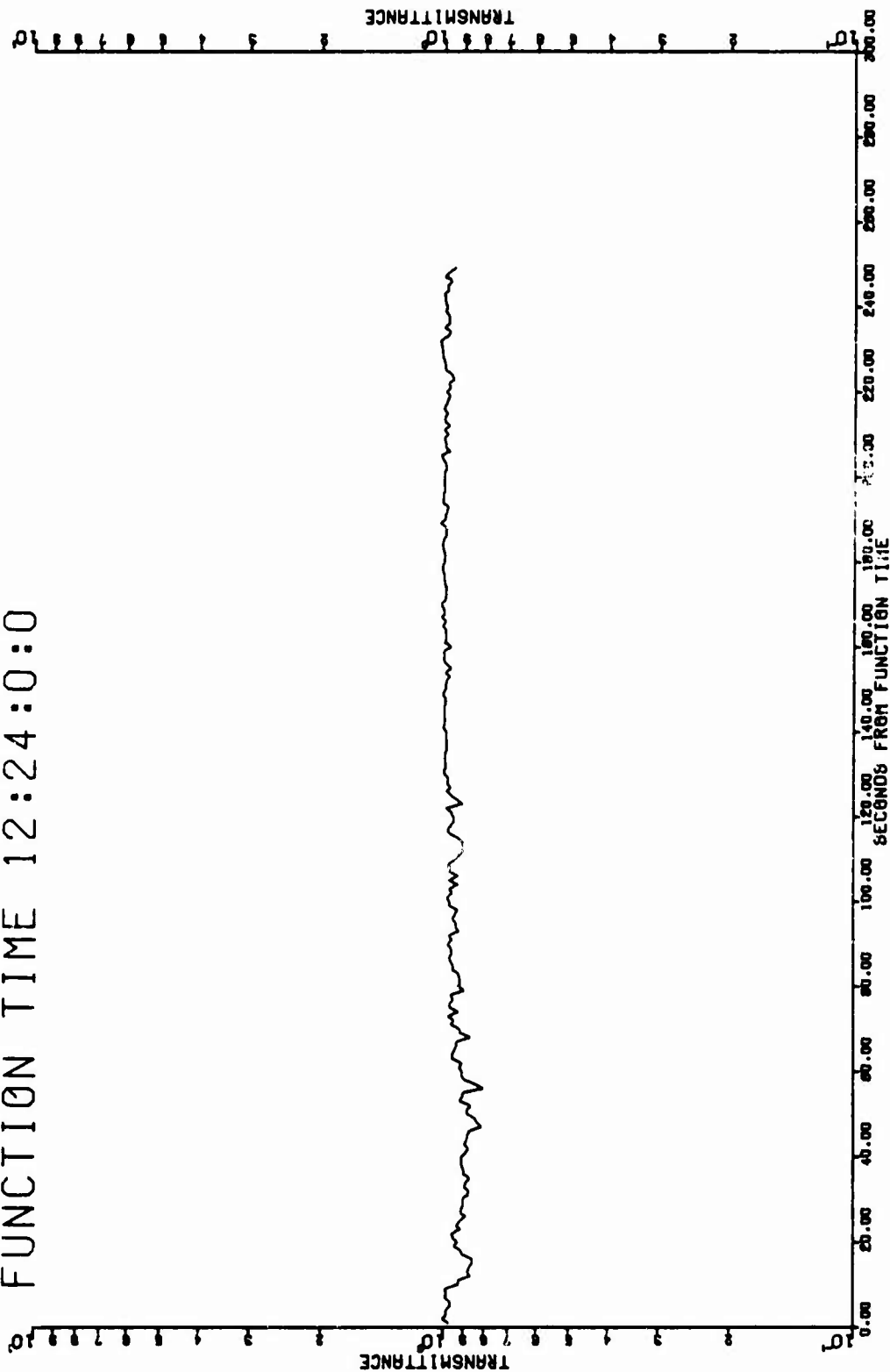
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



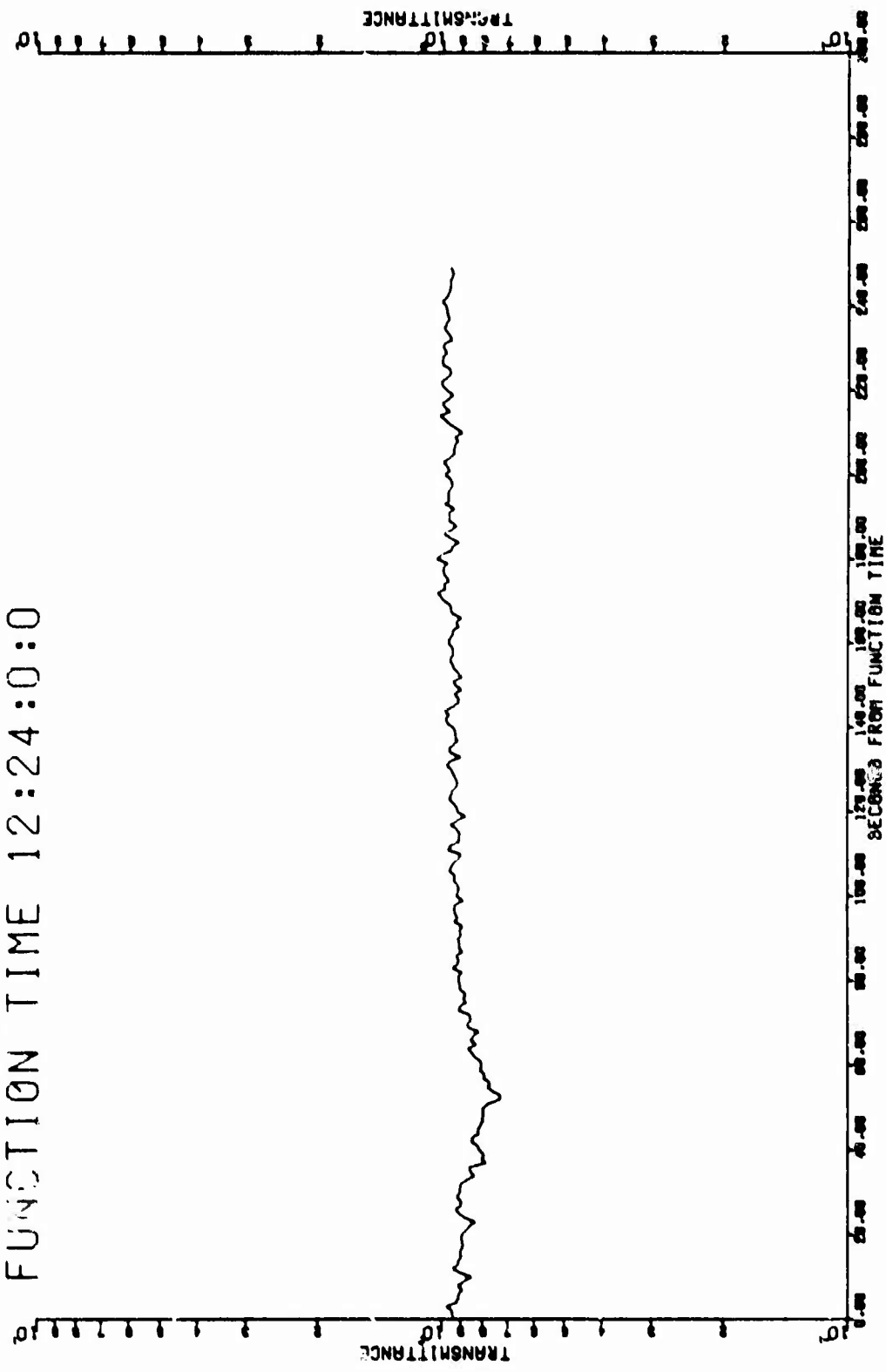
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



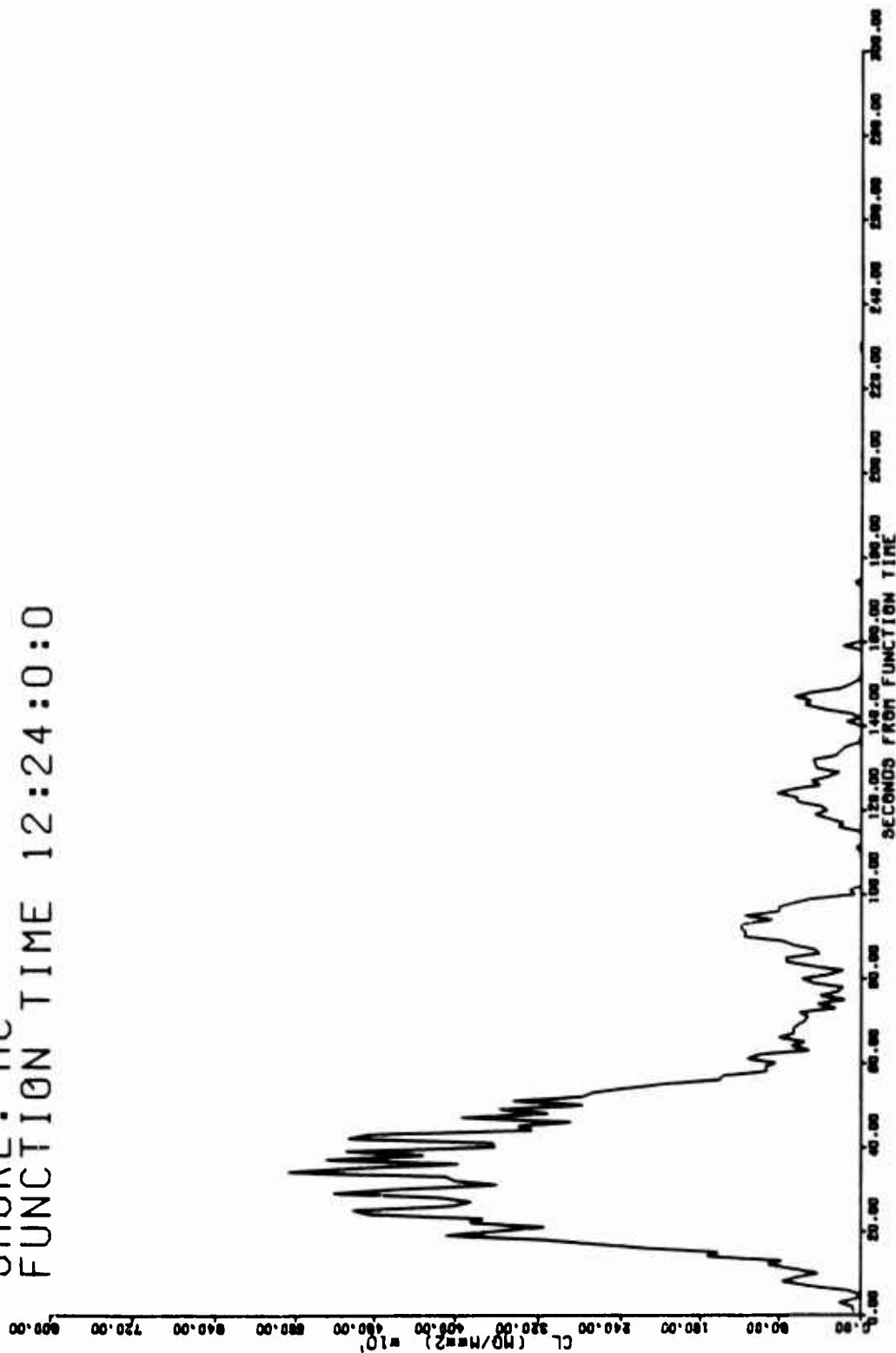
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



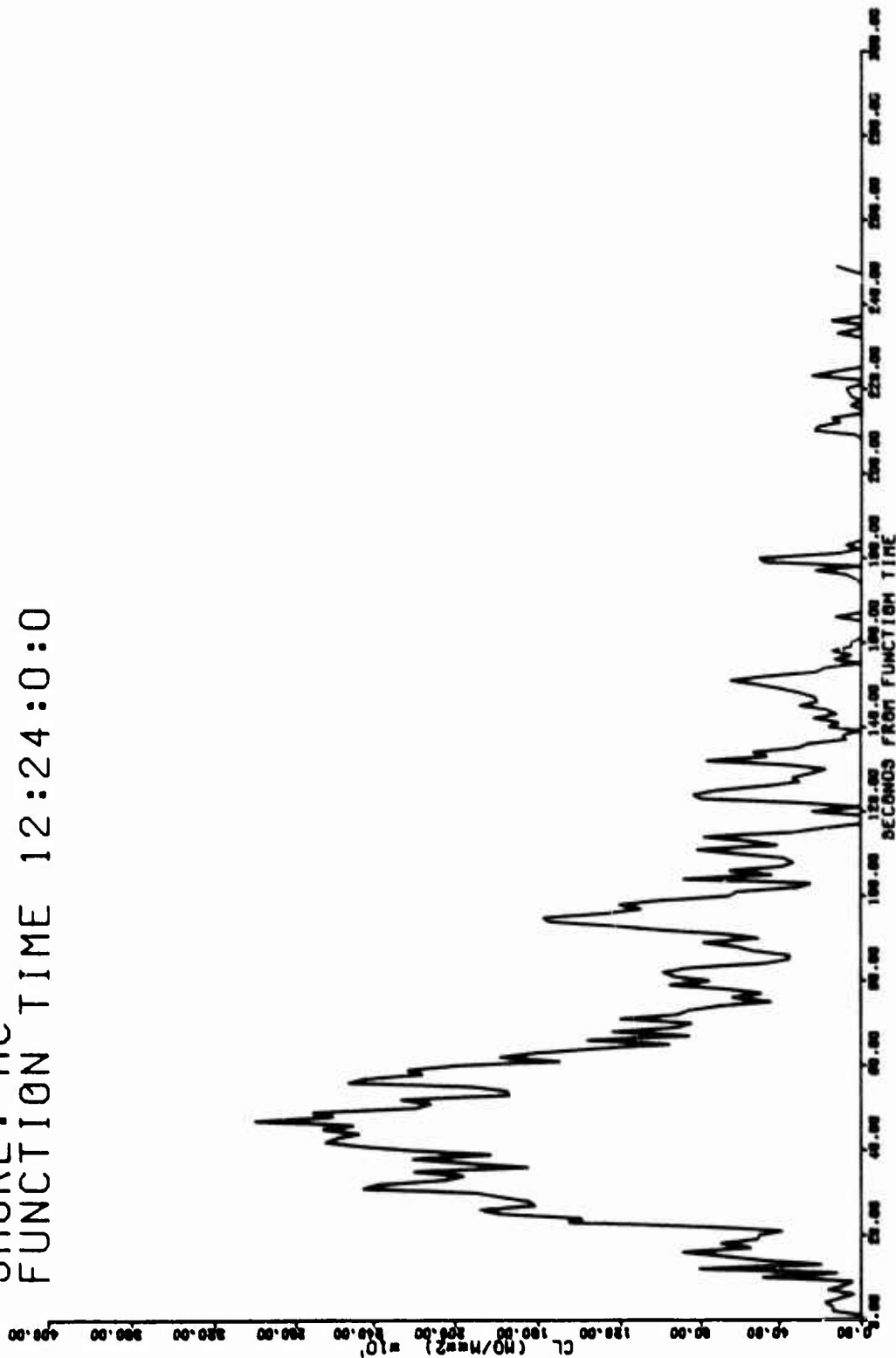
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #2 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 12:24:0:0



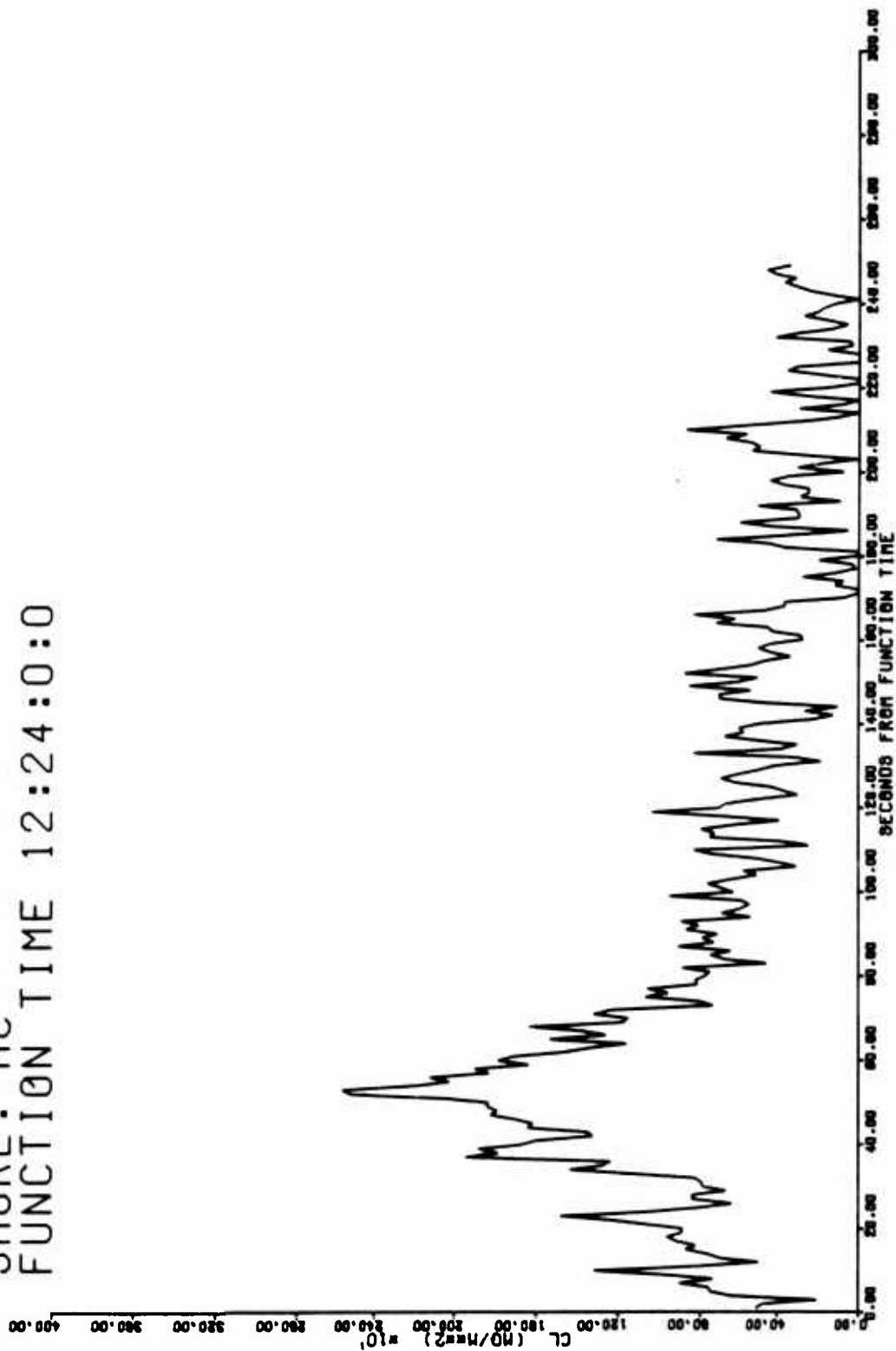
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #2 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 12:24:0:0



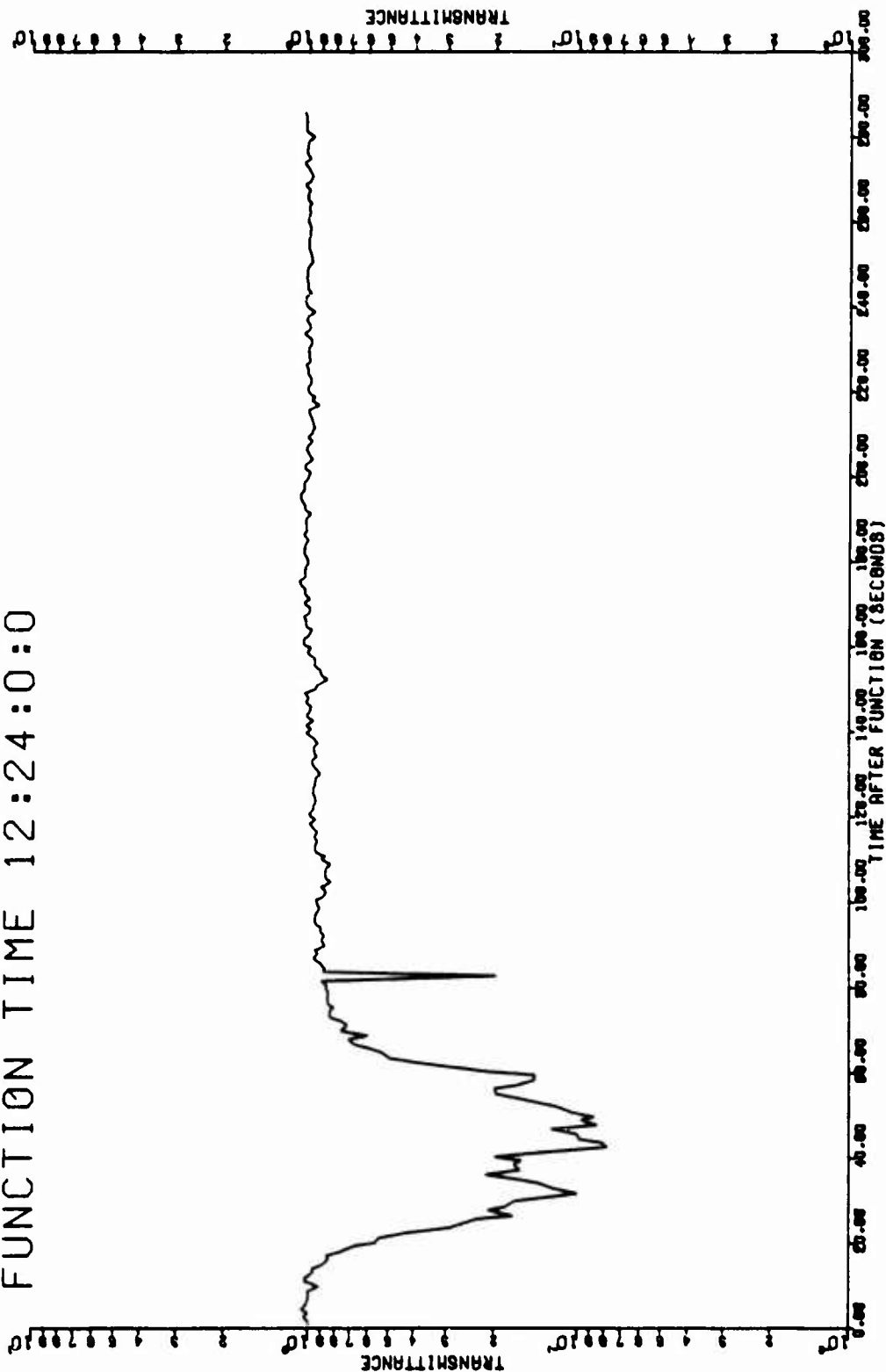
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



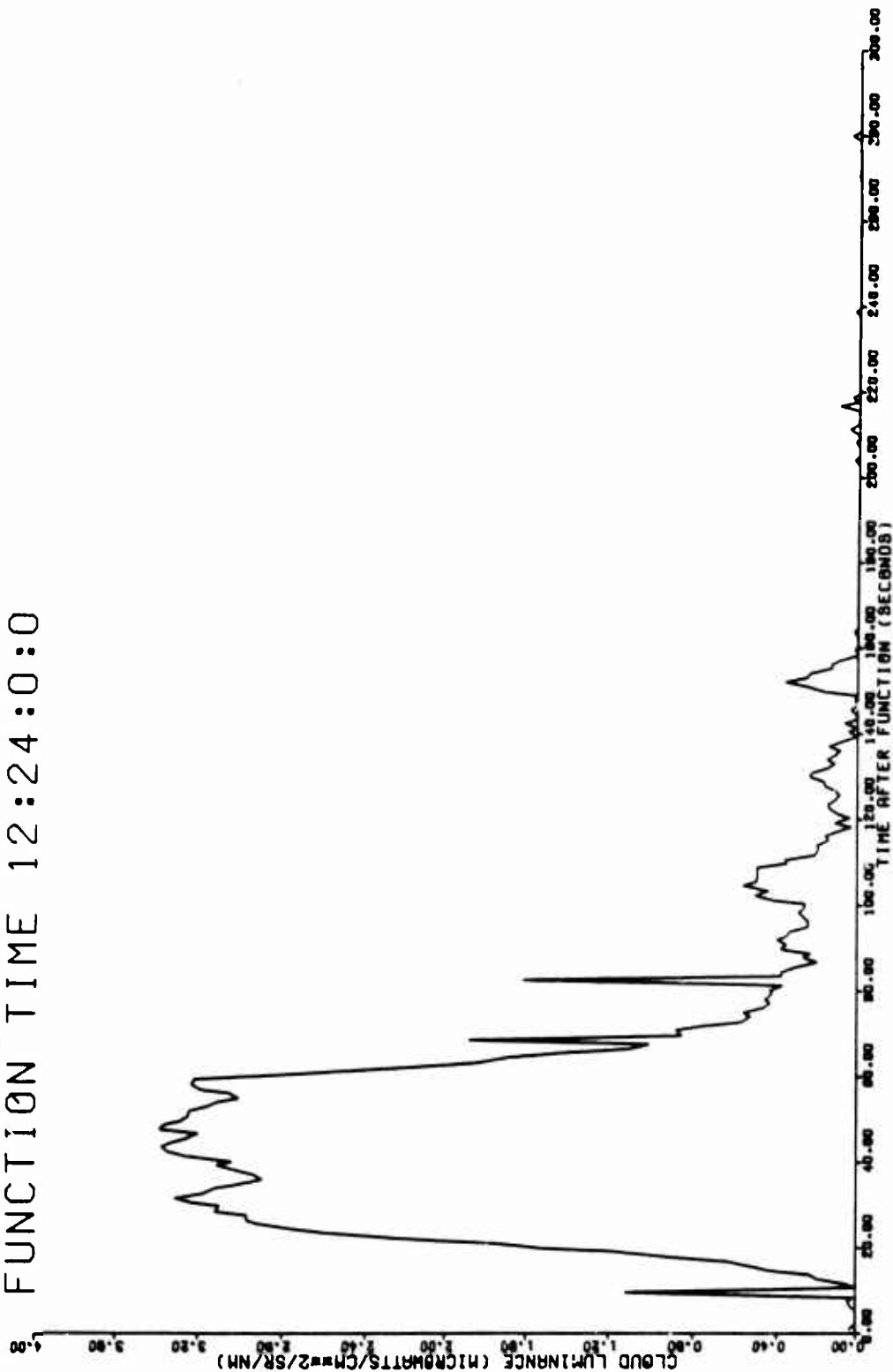
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



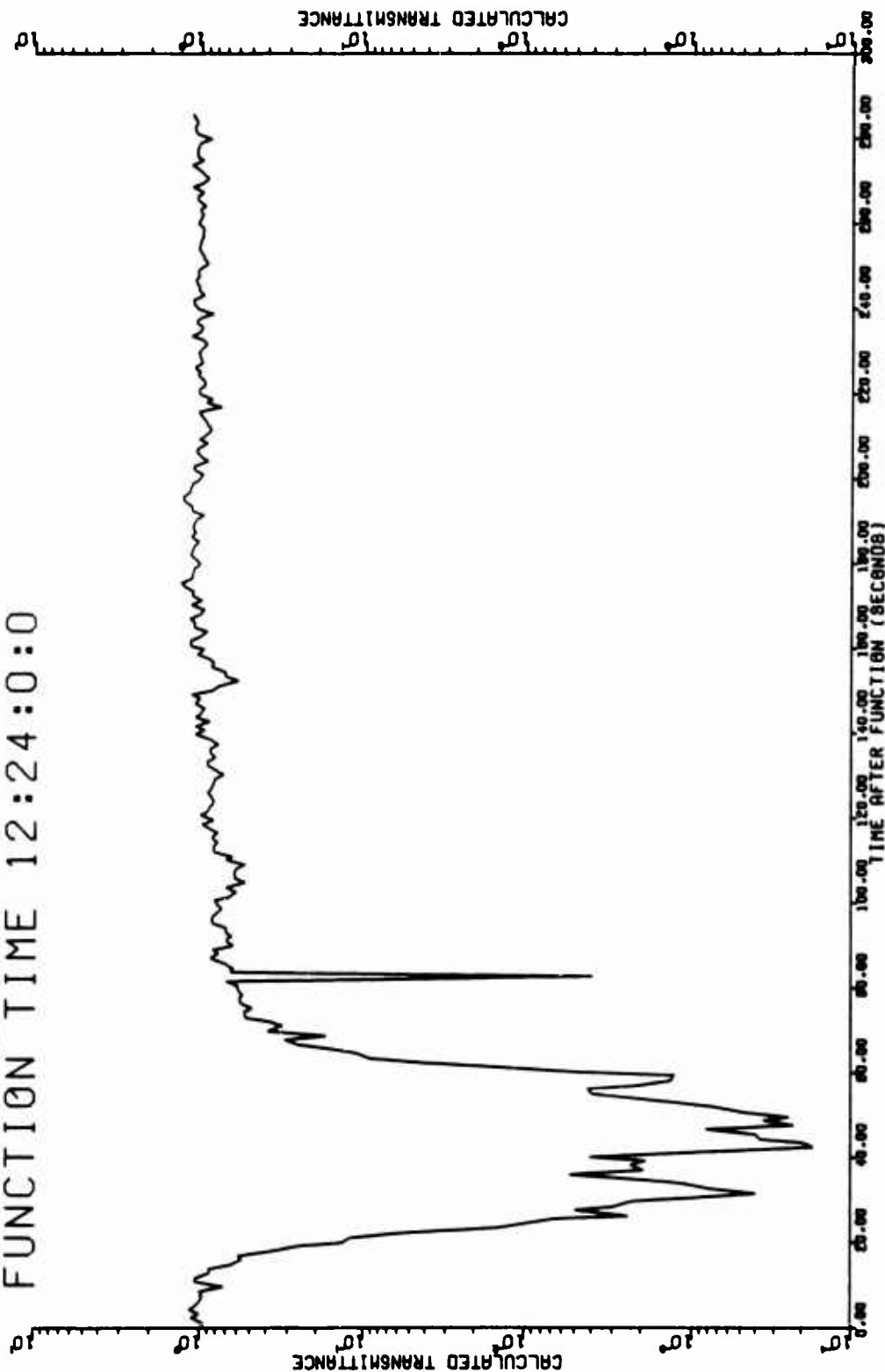
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



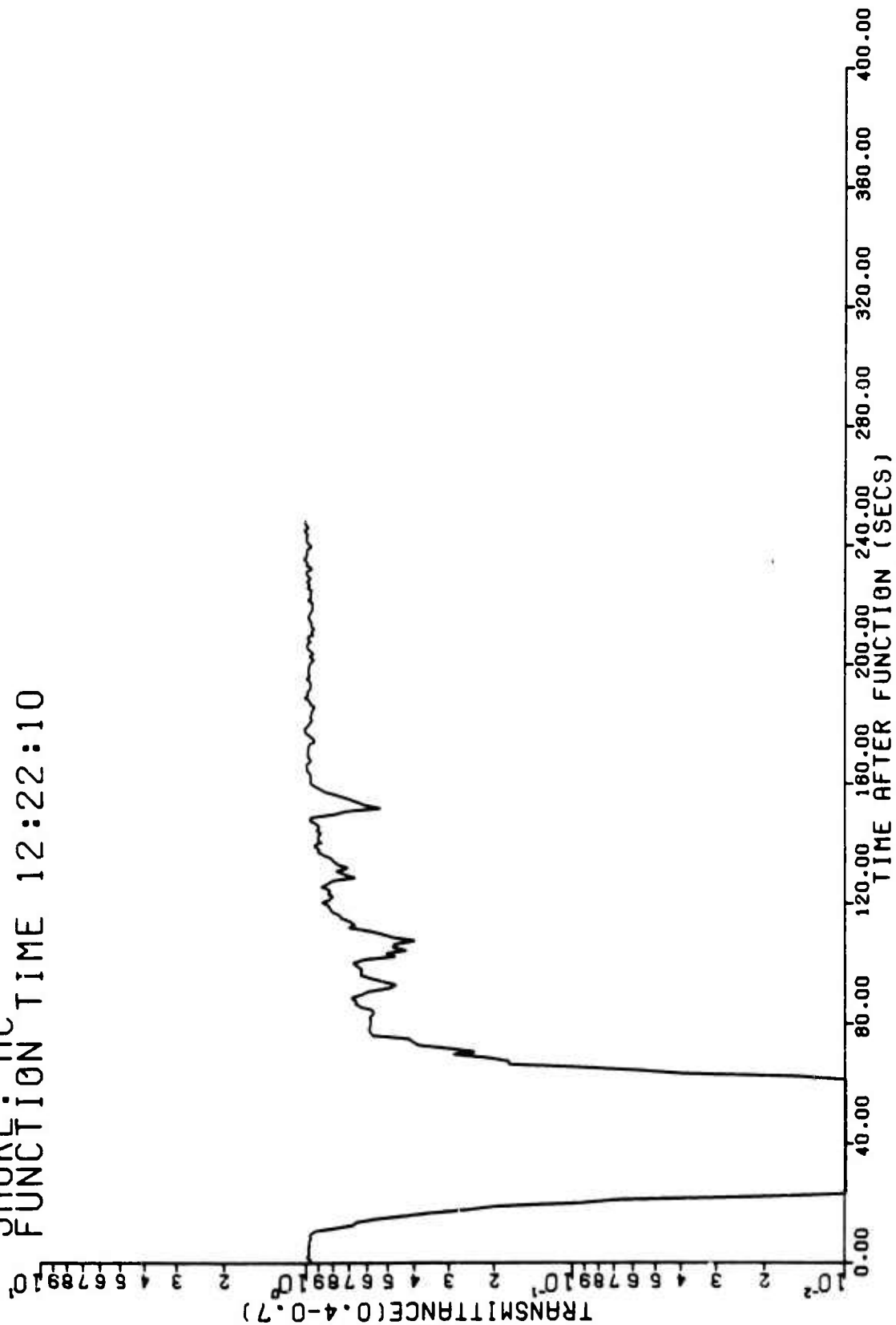
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #2 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:24:0:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

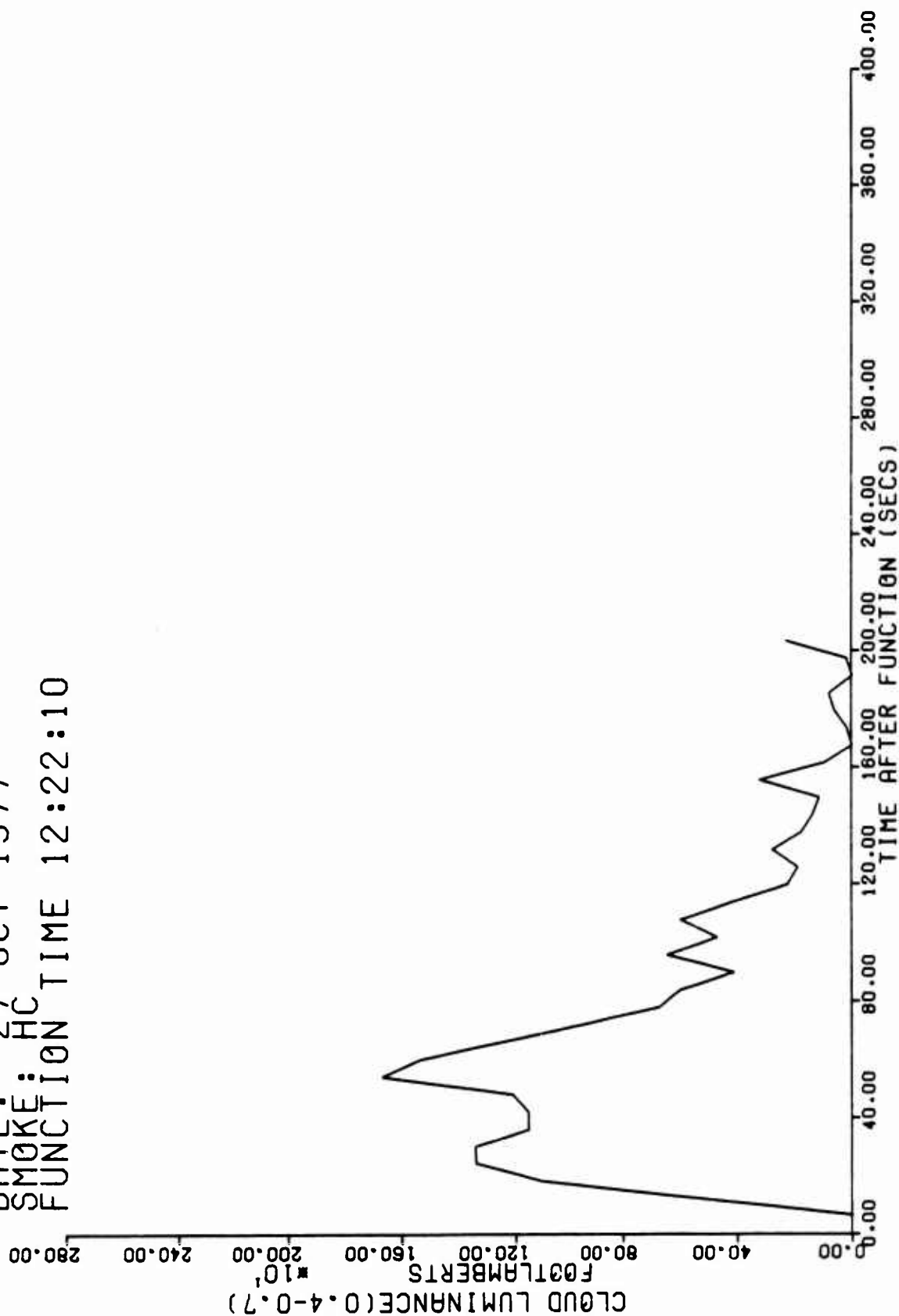
RIAL 2 (DP-1002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 12:22:10



B-I-2-27

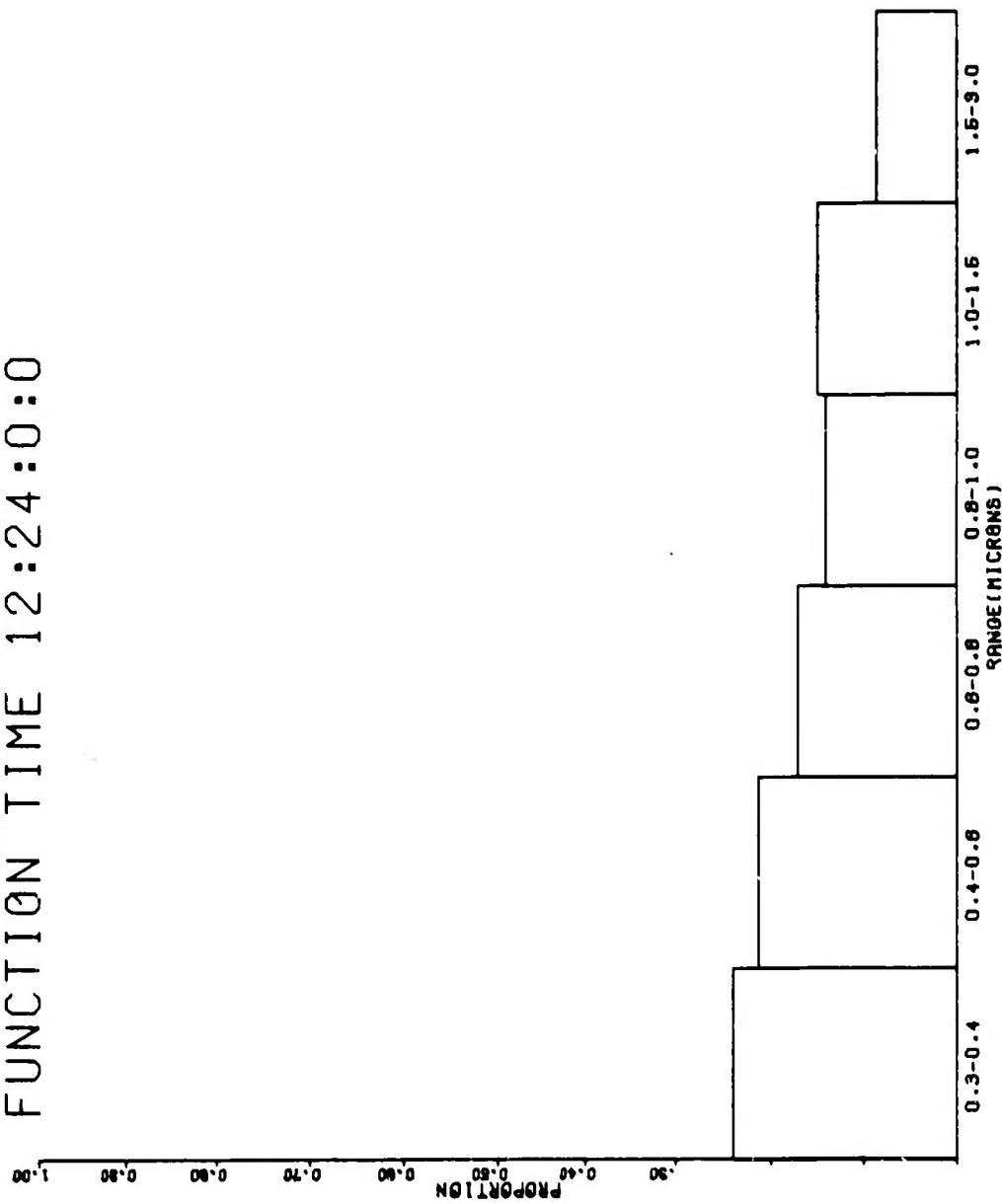
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 2 (DP-1002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 12:22:10



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

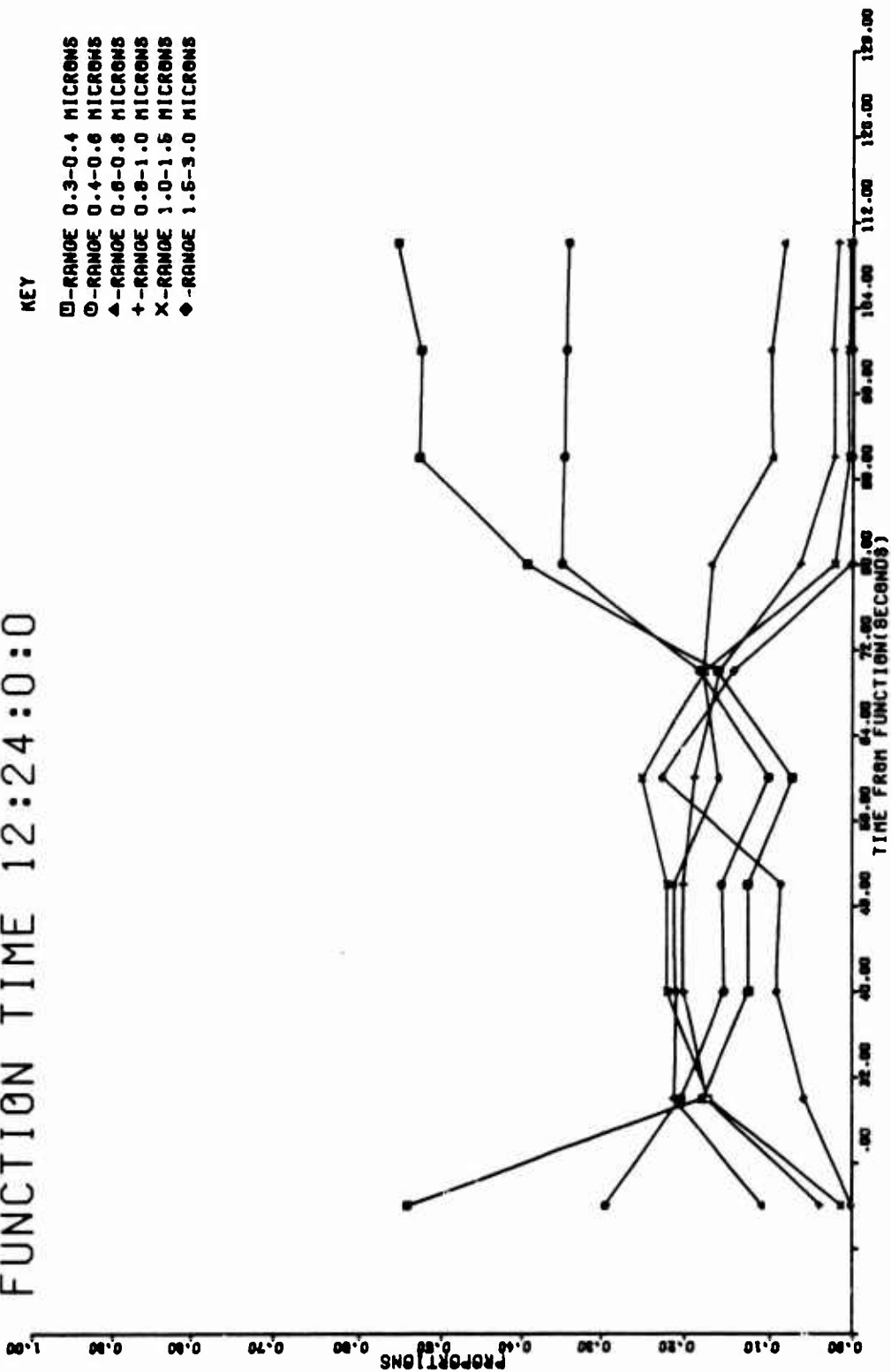
TRIAL #2 (DP1-002)
 DATE: 27 OCT 1977
 MAKE: HC
 FUNCTION TIME 12:24:0:0



ARTICLE SIZE DISTRIBUTION BASED ON NUMBER

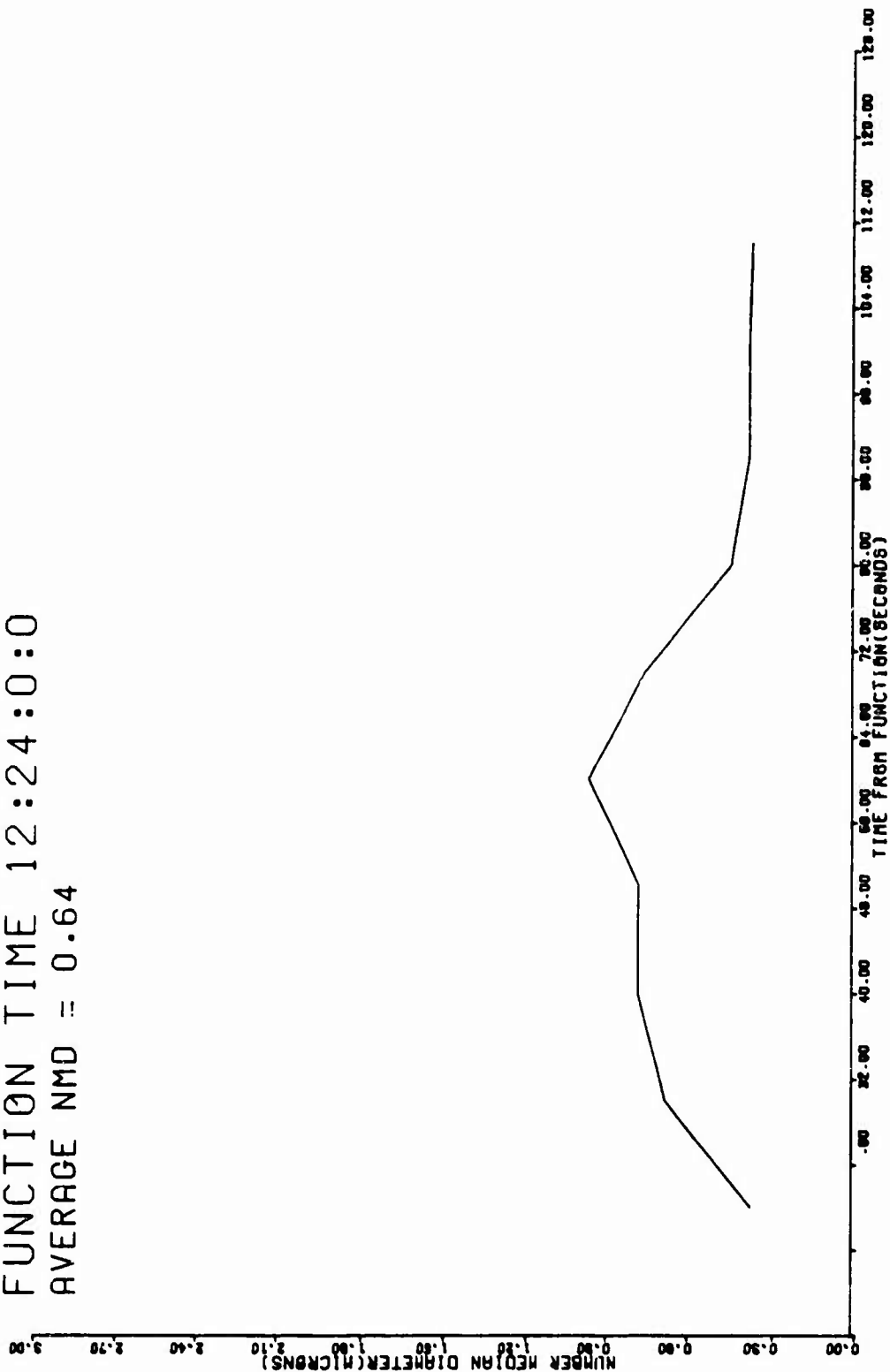
PSA #240

TRIAL #2 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 12:24:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #2 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 12:24:0:0
 AVERAGE NMD = 0.64



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-3

TRIAL DP1-002-T-3 (HC SMOKE) 2 NOV 1977

SUMMARY OF TEST DATA	B-I-3-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-3-5
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-3-6
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-3-7
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-3-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-3-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-3-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-3-22
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-3-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-3-24
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-3-25
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-3-26
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-3-27
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-3-28
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-3-29

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-3-30
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-3-31
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-3-32
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-3-33

SUMMARY OF TEST DAY DATA

Trial: DP1-002 Trial 3

Date: 2 Nov 77

Time: 1346 MST

Wind Direction (Transport) (degrees) (4m)	123
Mean Wind Speed (Transport) (\bar{u} , m/sec)	4.4
Temperature of 2-meters, Trial Time (T , $^{\circ}\text{C}$)	20.1
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	15.0
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	5.8
Temperature Gradient, 0.5-8m (ΔT , $^{\circ}\text{C}$)	-1.5
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.10
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	19
Solar Azimuth (deg)	205.6
Solar Altitude (deg)	31.5
Air Density - ρ (kg m^{-3})	1.029
Solar Radiation (Langleys per minute)	0.783
Barometric Pressure (millibars)	866.6
Visibility (km)	137
Reflectivity, OD Target	0.21
Haze (footlamberts)	130
Brightness, Background (footlamberts)	850
Brightness, White Target (footlamberts)	1475
Brightness, OD Target (footlamberts)	450
Percent Opaque Cloud Cover	2

Munitions/Submunitions Used (HC, 105mm)	18
Number of Munitions/Submunitions Functioned	18
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.13
(0.4 - 0.6) . . . . .	.17
(0.6 - 0.8) . . . . .	.19
(0.8 - 1.0) . . . . .	.18
(1.0 - 1.5) . . . . .	.22
(1.5 - 3.0) . . . . .	.11
Log ₁₀ NMD	-.10805
^a Log ₁₀ NMD	0.23509
NMD	0.78
MMD	1.05

Initial Cloud Dimensions (Meters) *

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
-------------	---------------	--------------	---------------

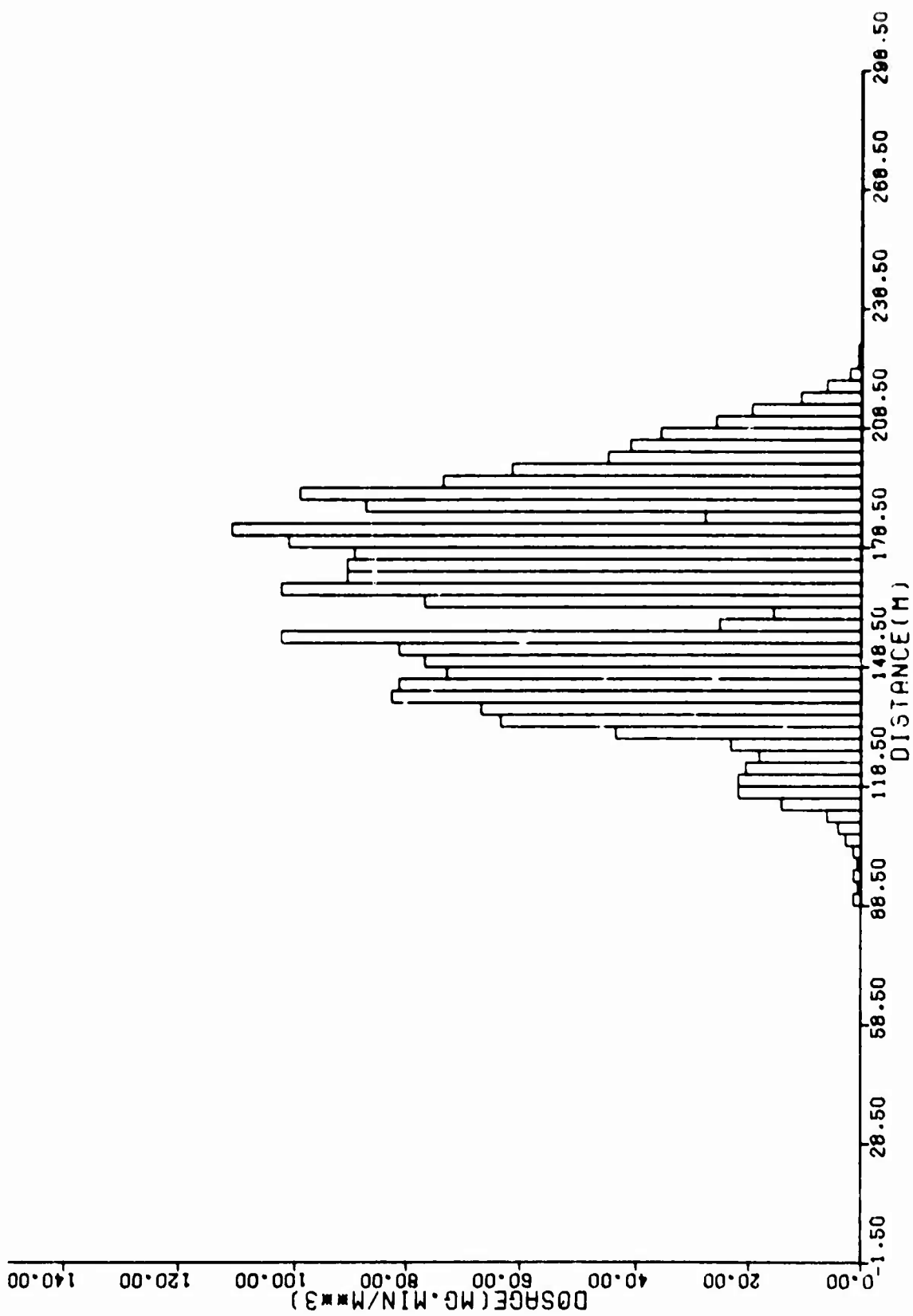
* Not available

SKY BRIGHTNESS

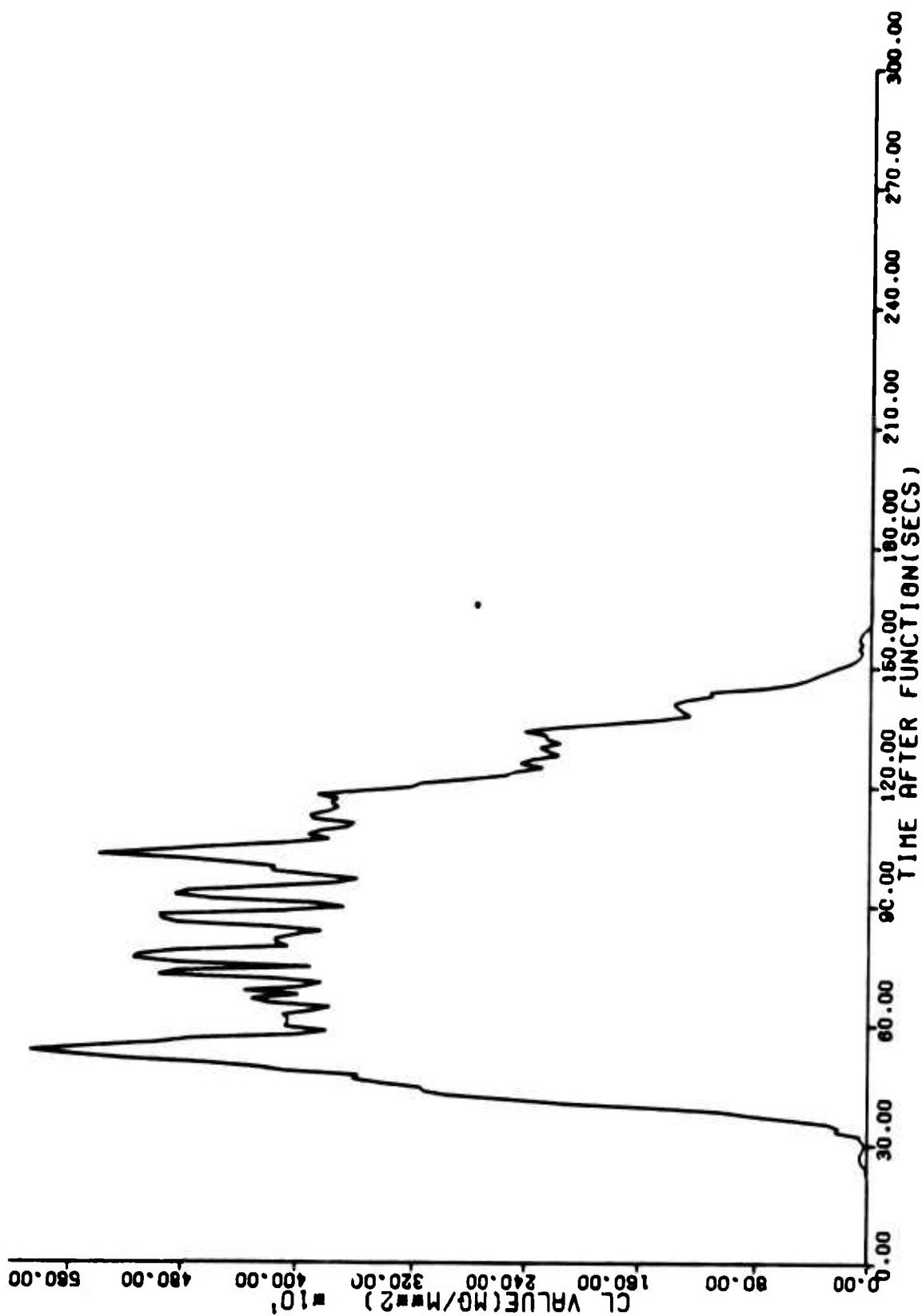
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	3932
5	3300
10	4564
15	4564
20	4564
25	5200
30	5200
35	5200
40	5200
45	5200

Viewing azimuth 240° except 255° at 0 degrees elevation

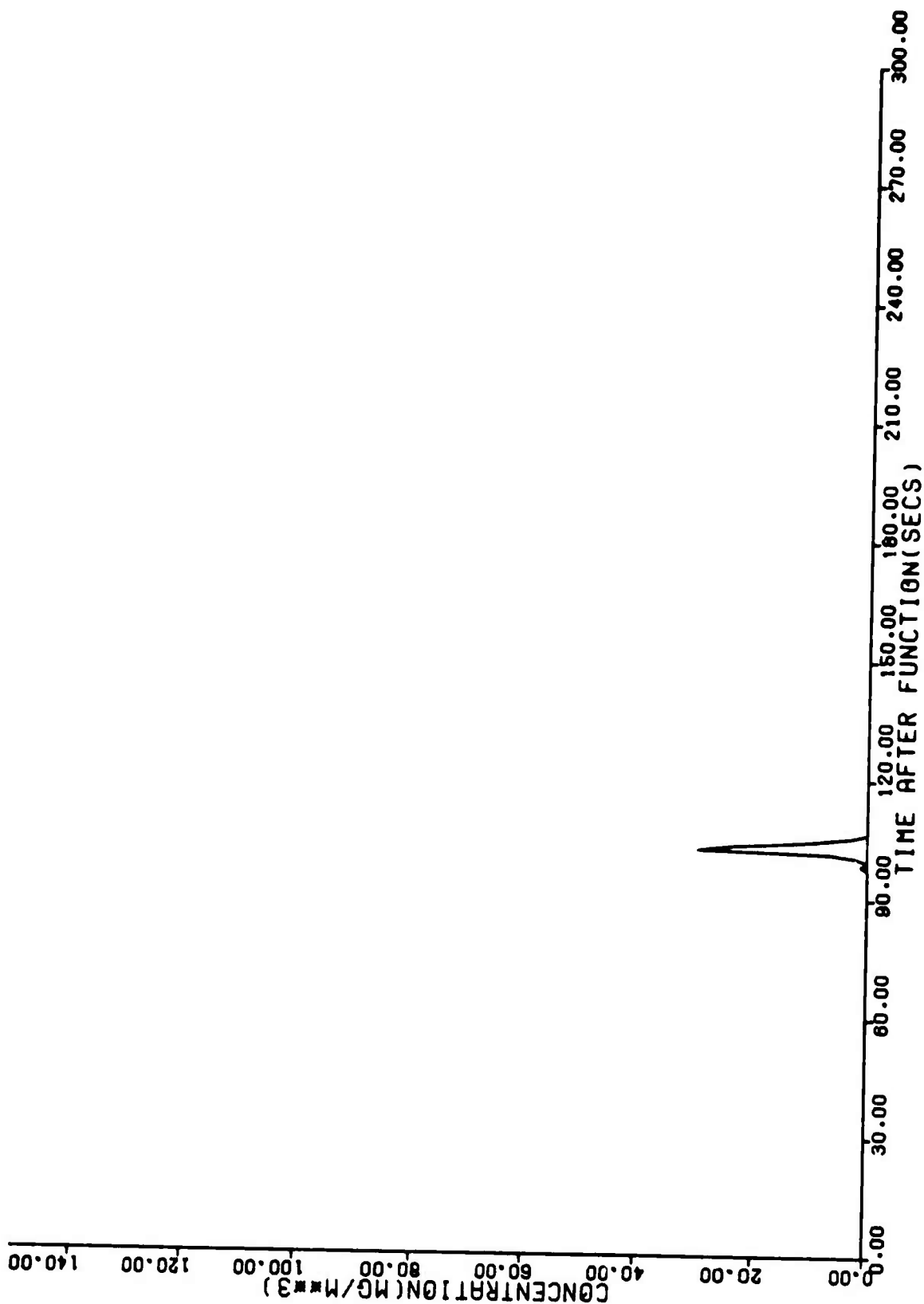


TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE



TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

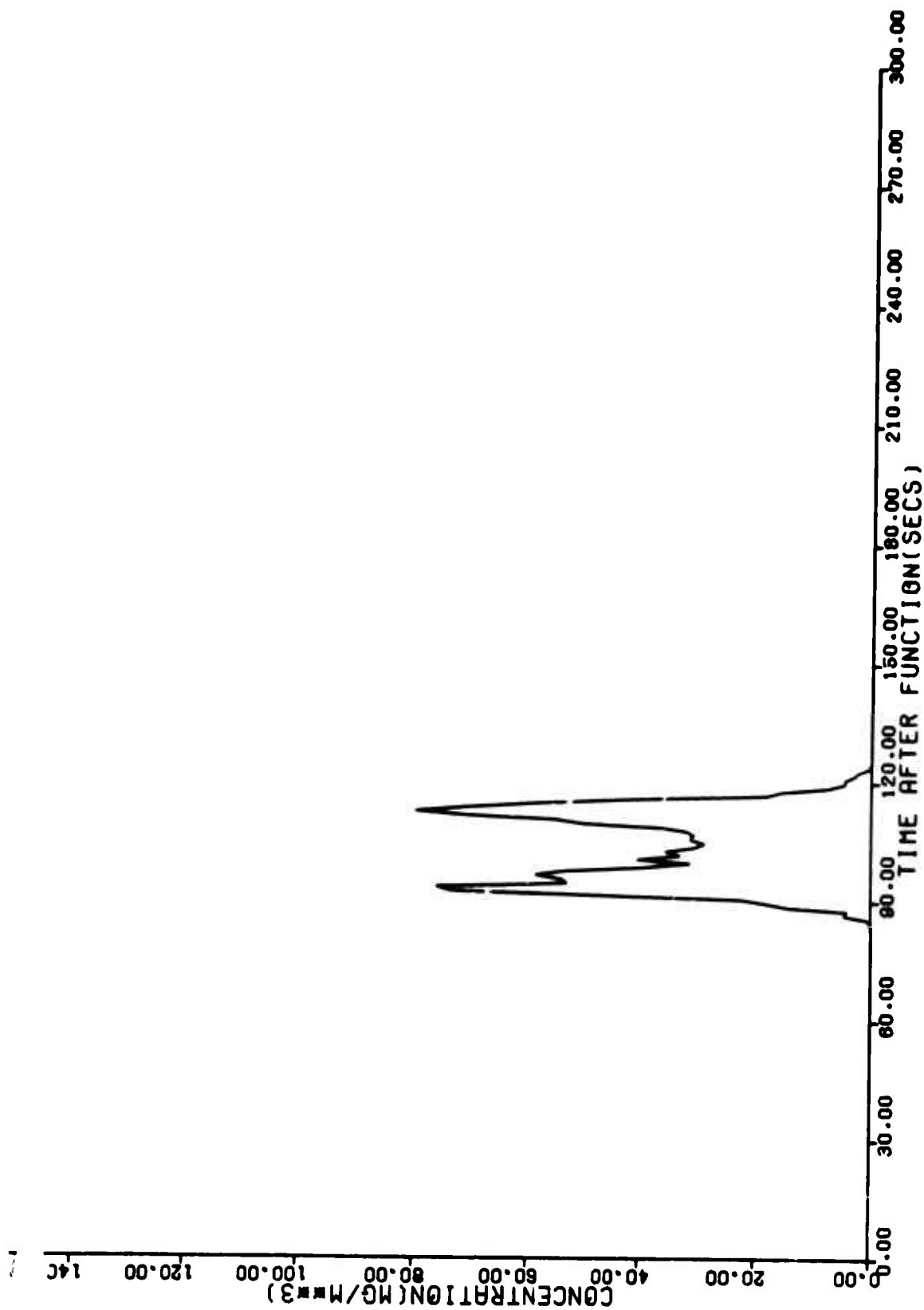
CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

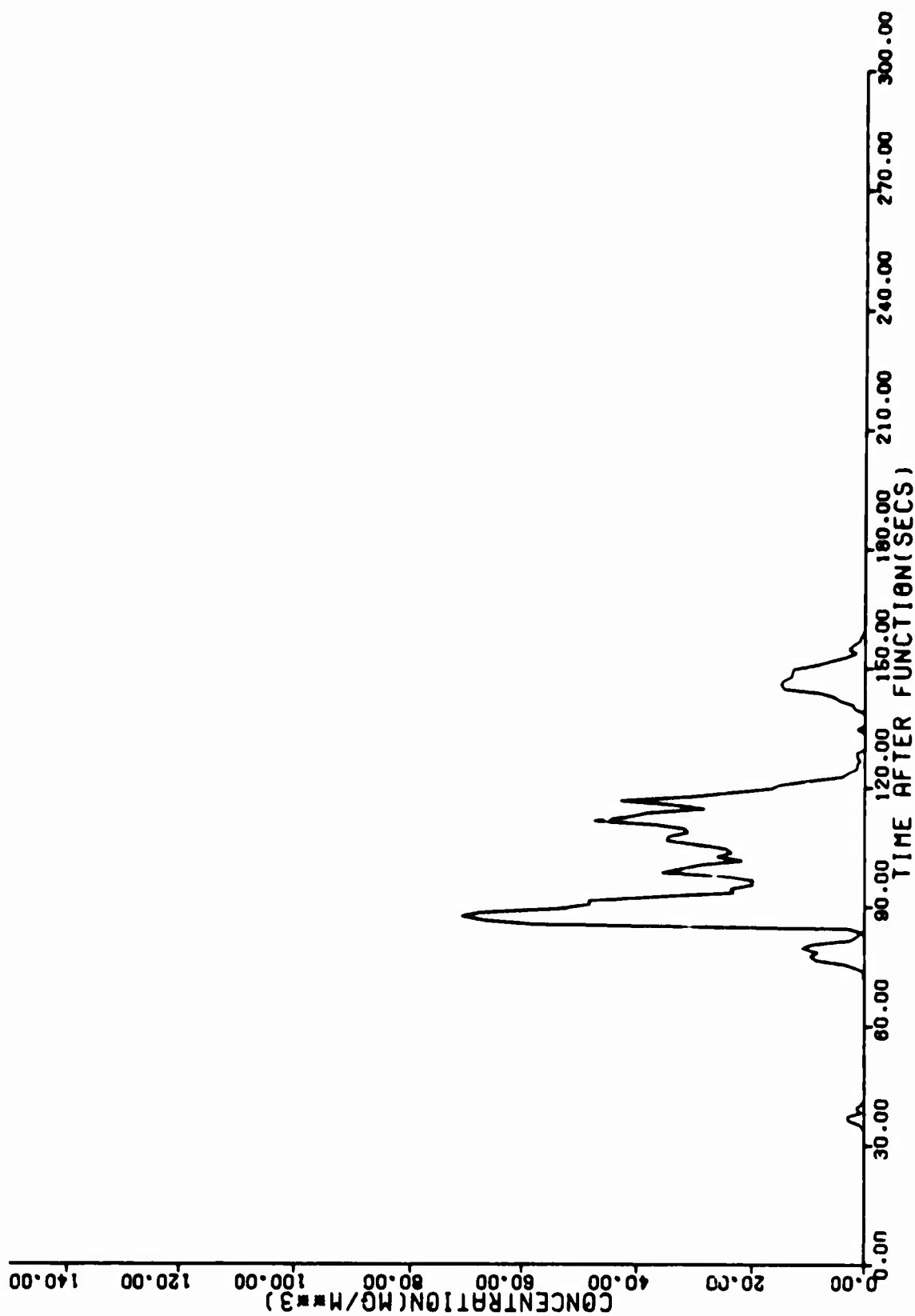
AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00

B-I-3-8

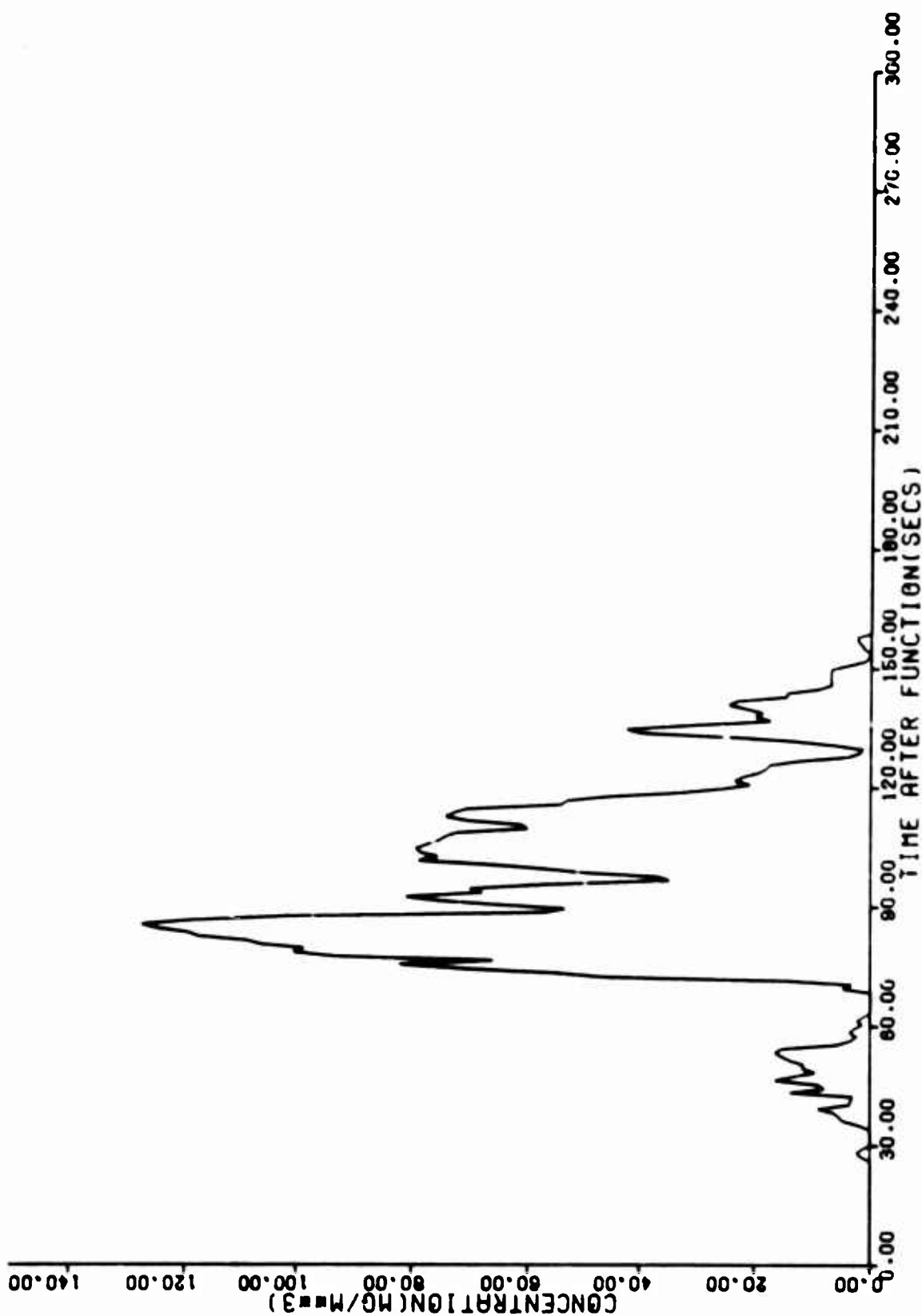


TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00

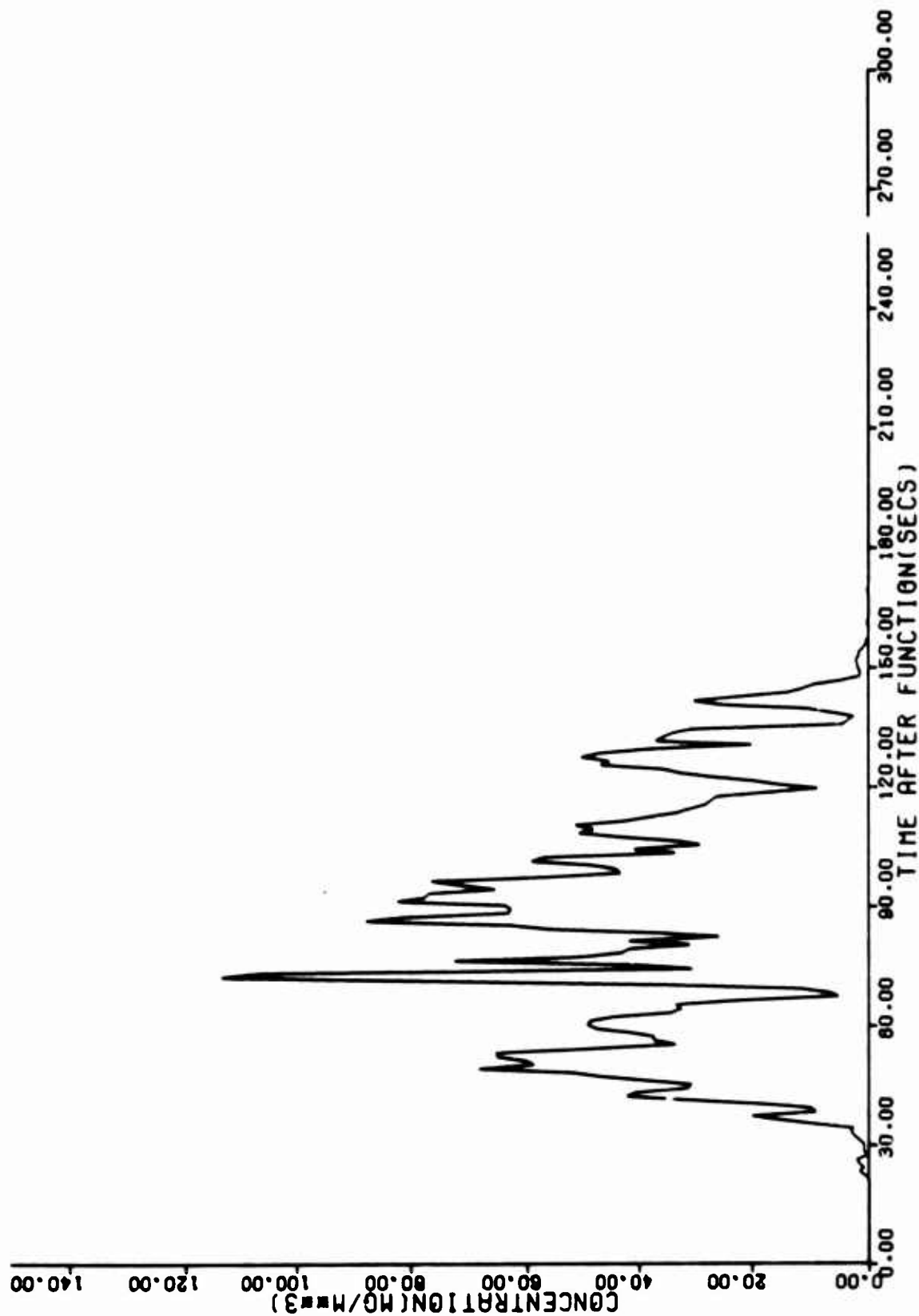


TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE



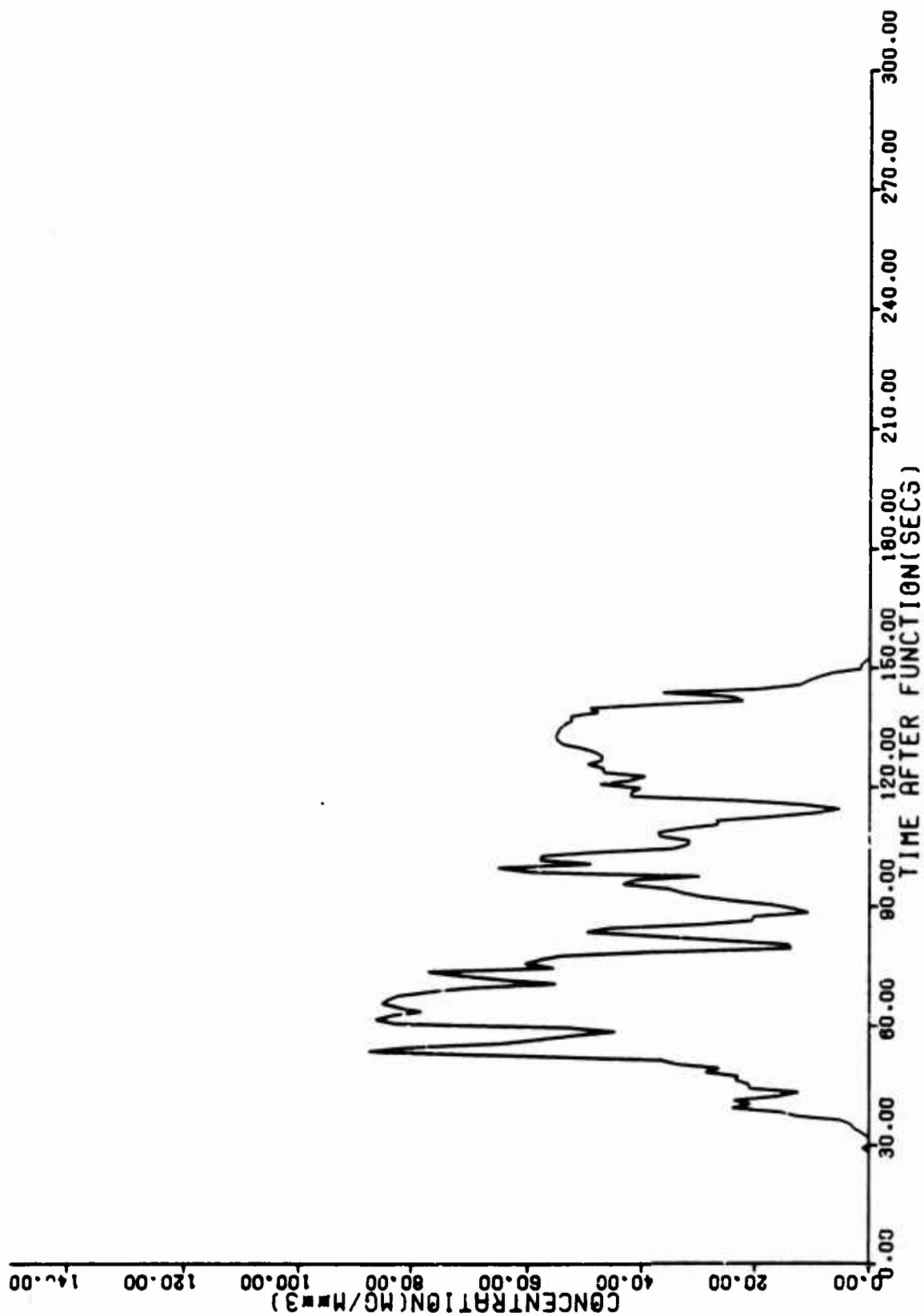
TRIAL 3 (DP-1002). 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



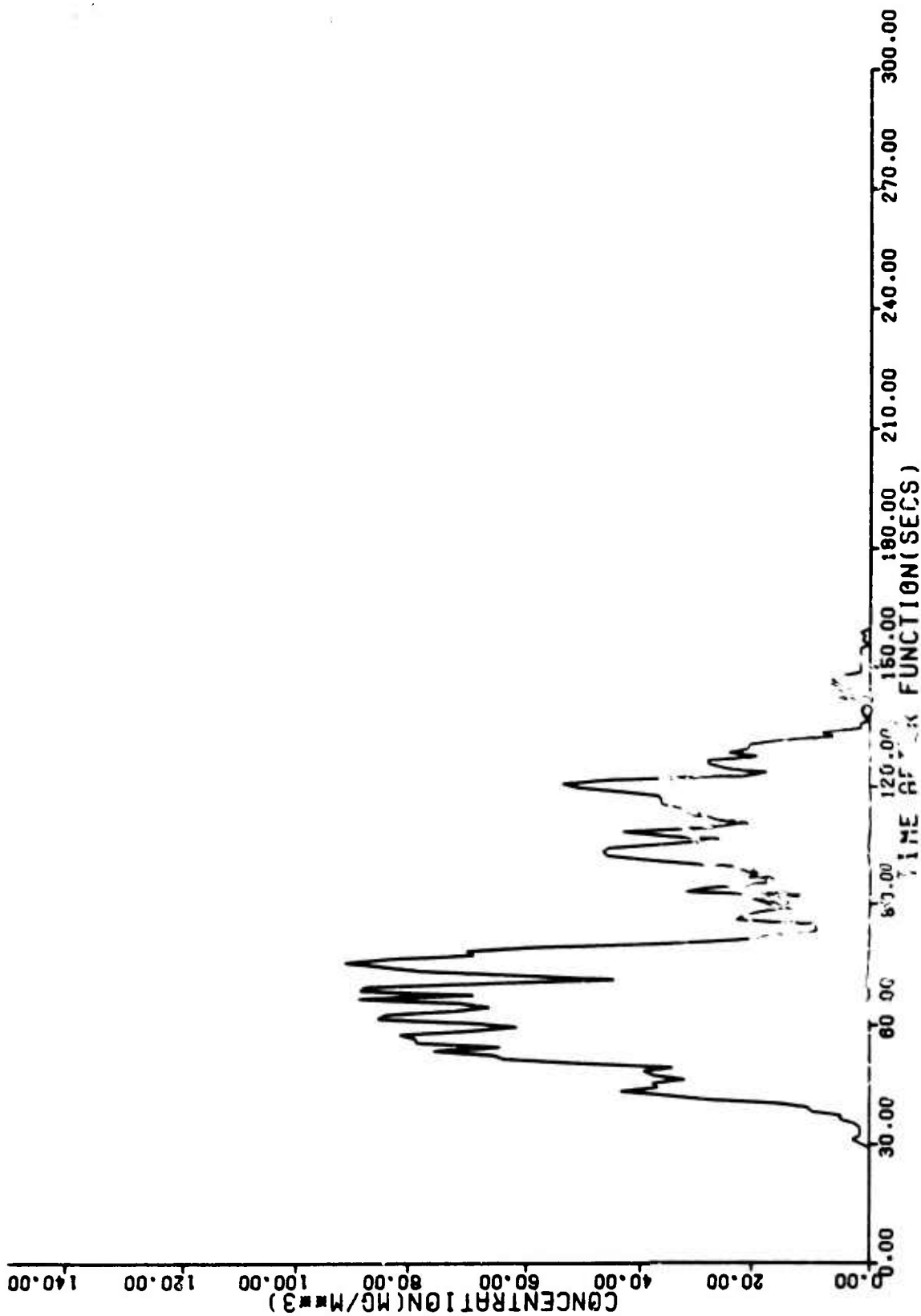
TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00



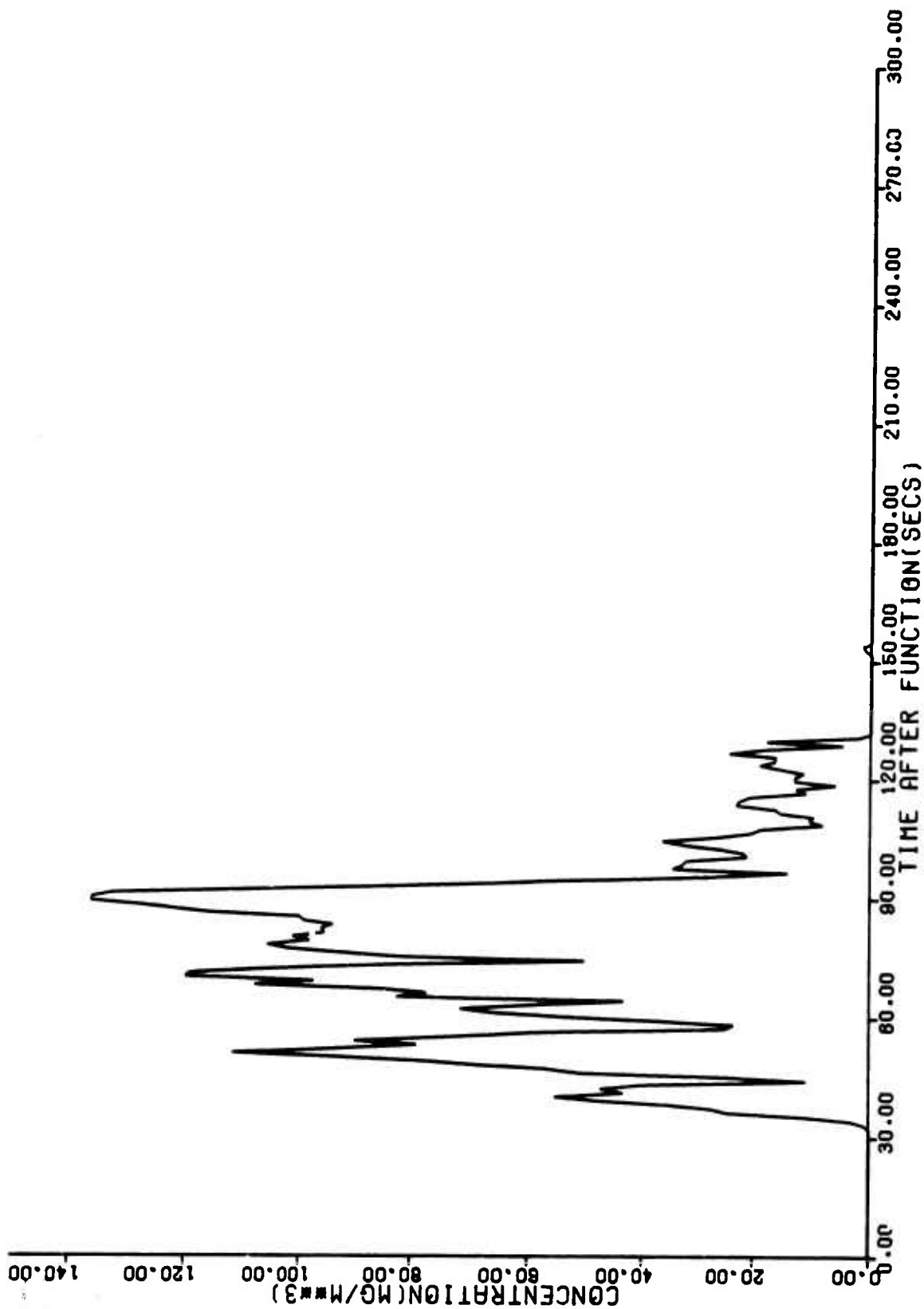
TRIAL 3 (DP-1002). 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



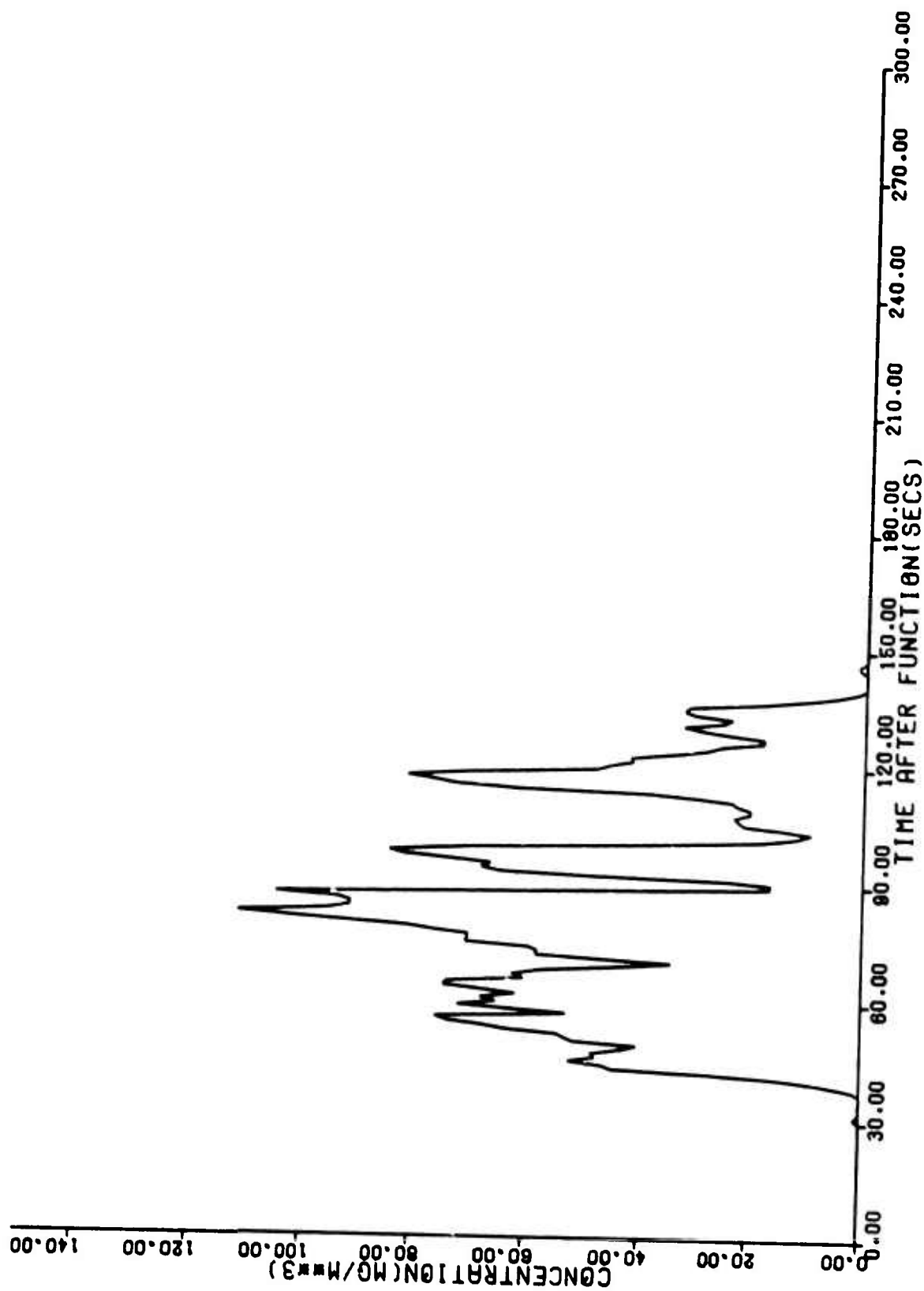
TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTO METER #12, X=0.00, Y=165.00, Z=0.00



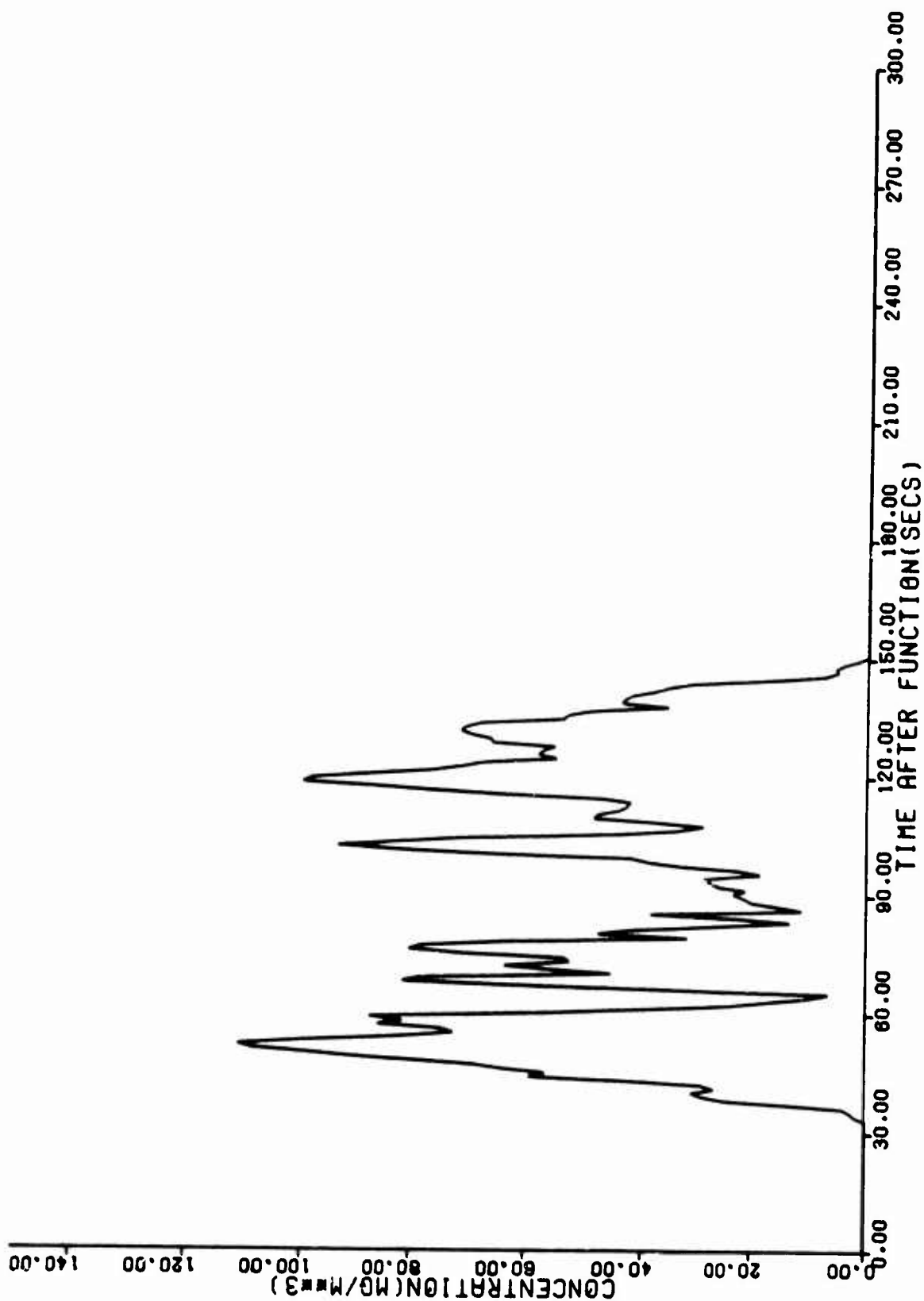
TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00



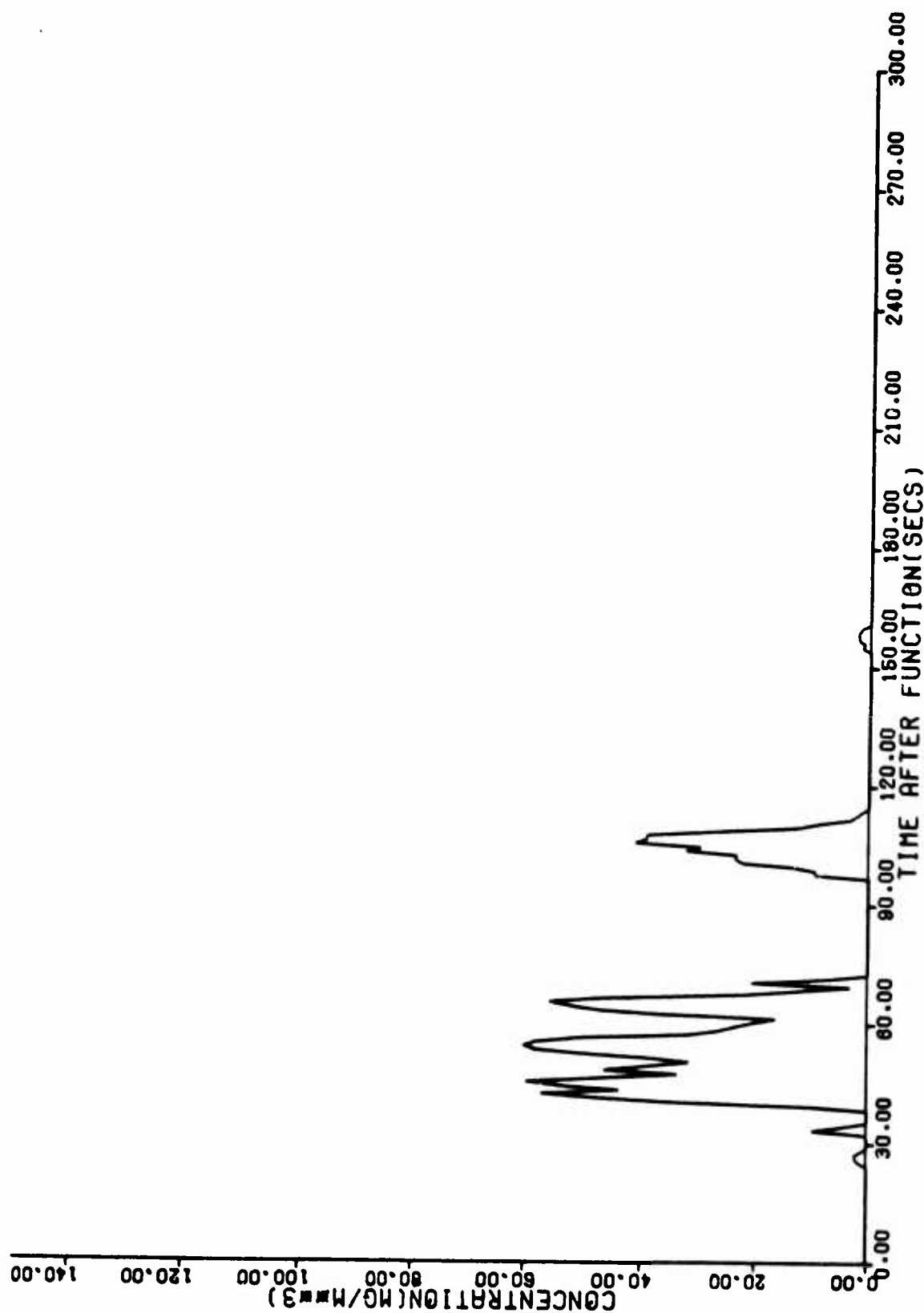
TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00



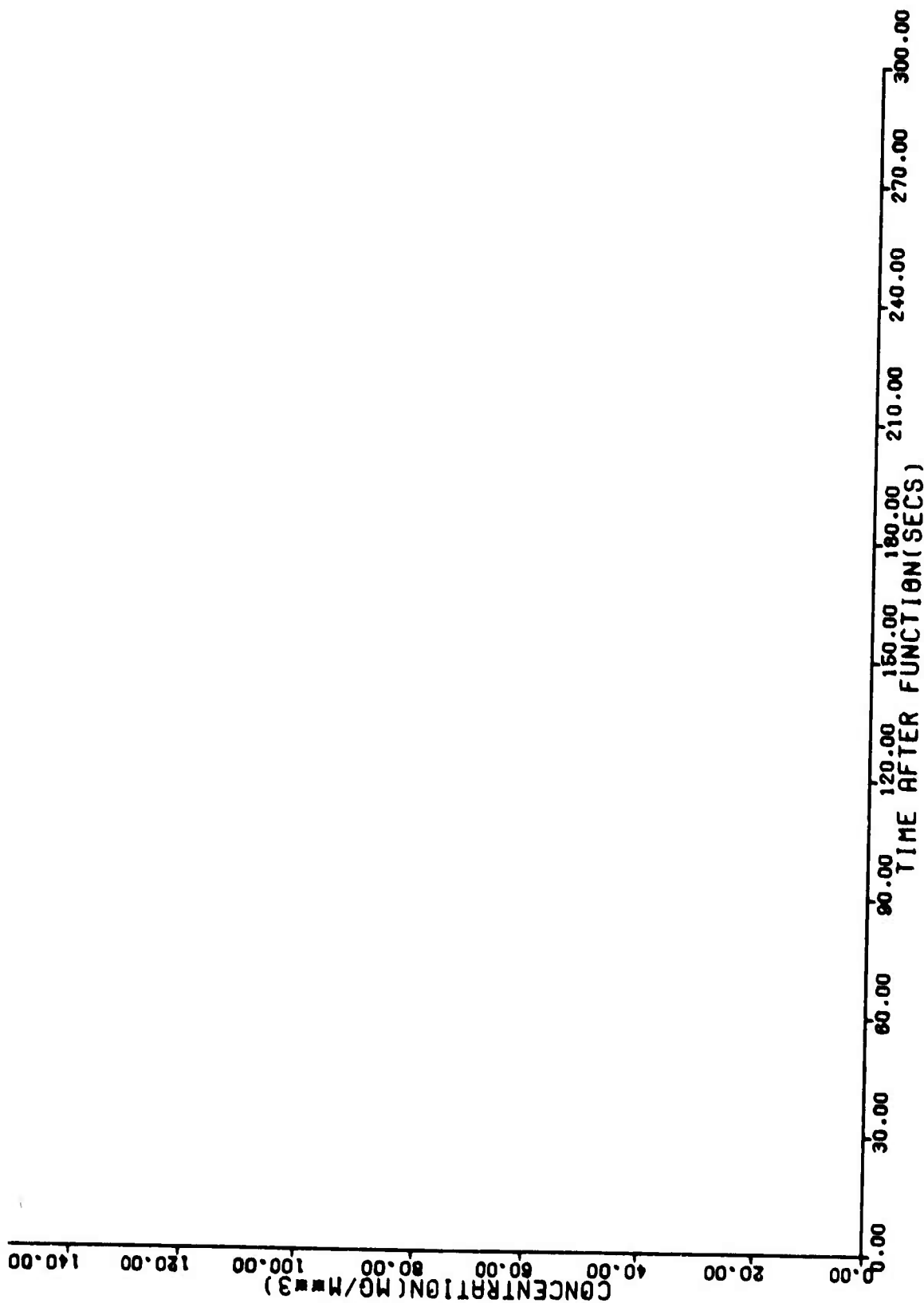
TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, P.C SMOKE

AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

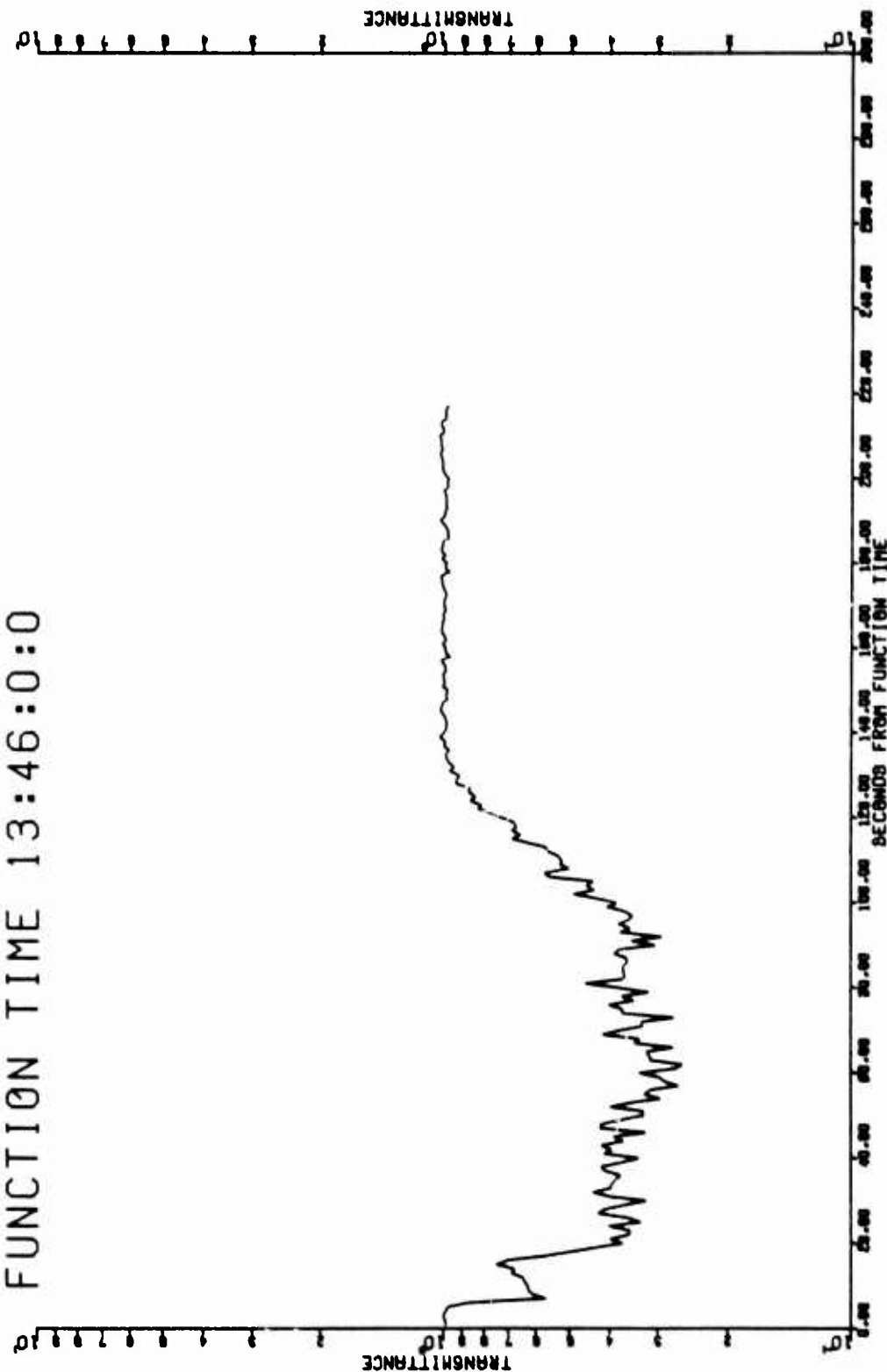
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00



TRIAL 3 (DP-1002), 2 NOV 1977, 13:46:00, HC SMOKE

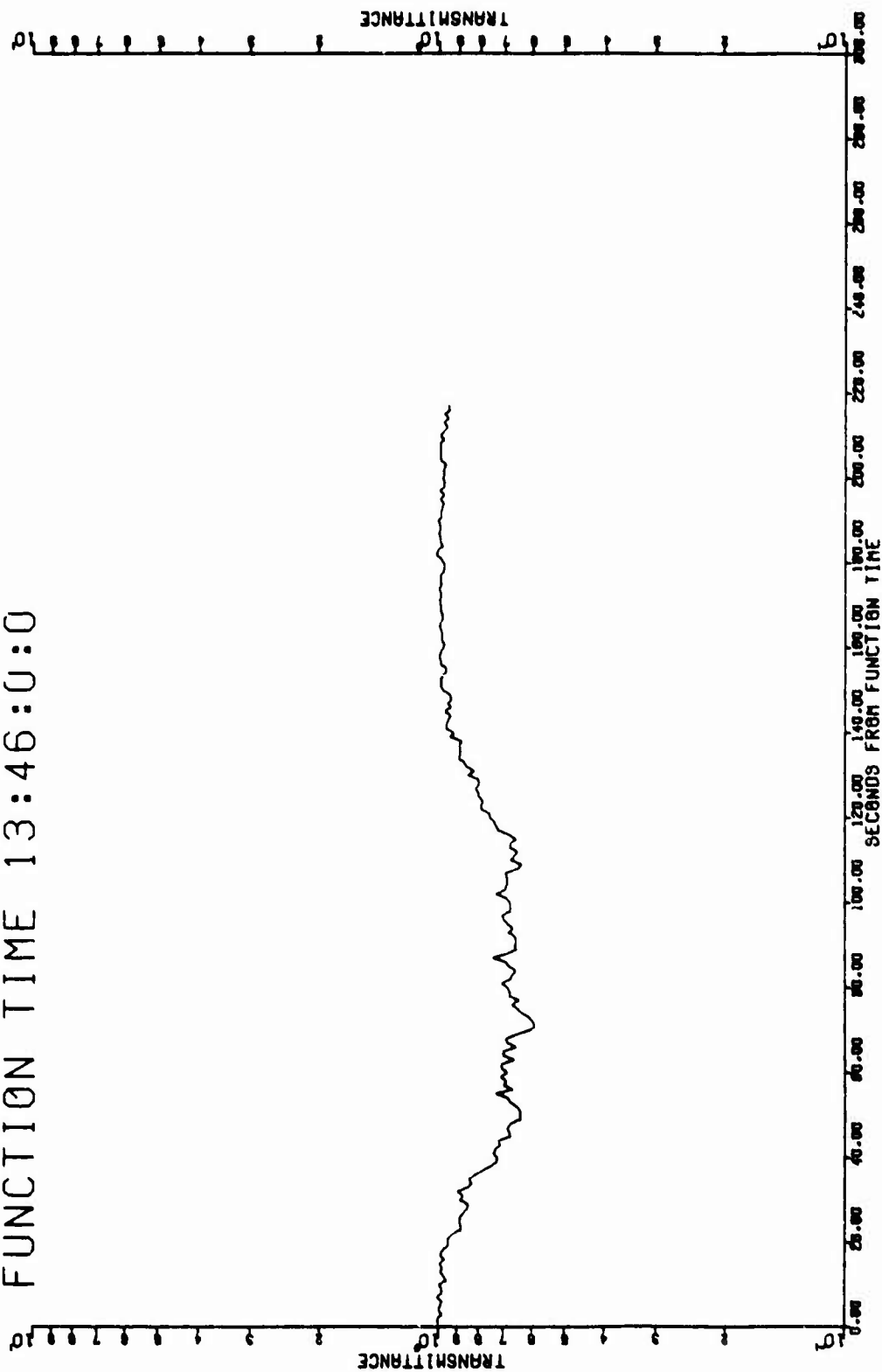
AEROSOL PHOTOMETER #17, X=0.00, Y=228.00, Z=0.00

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



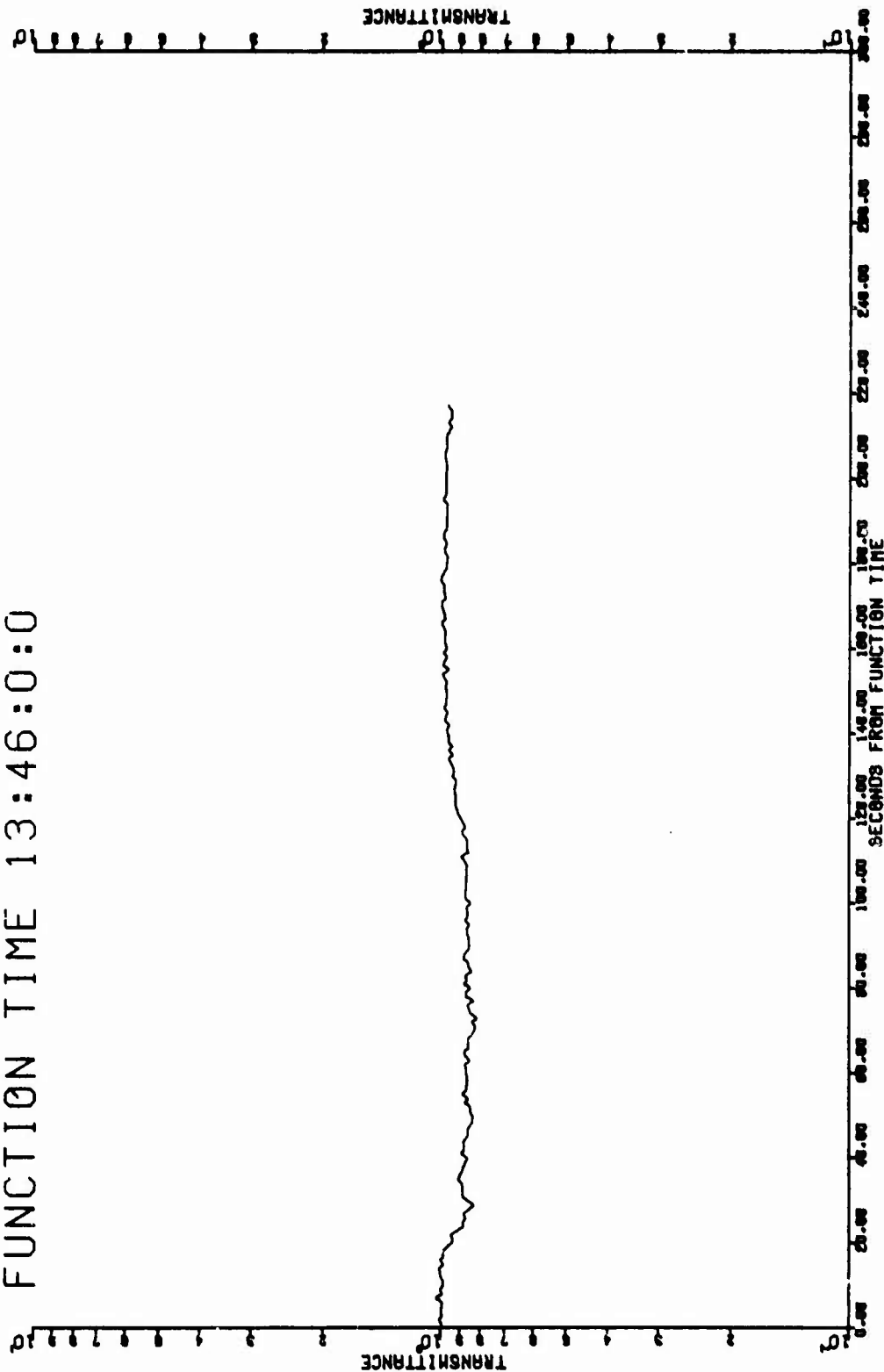
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #3 (DP1-002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:0:0



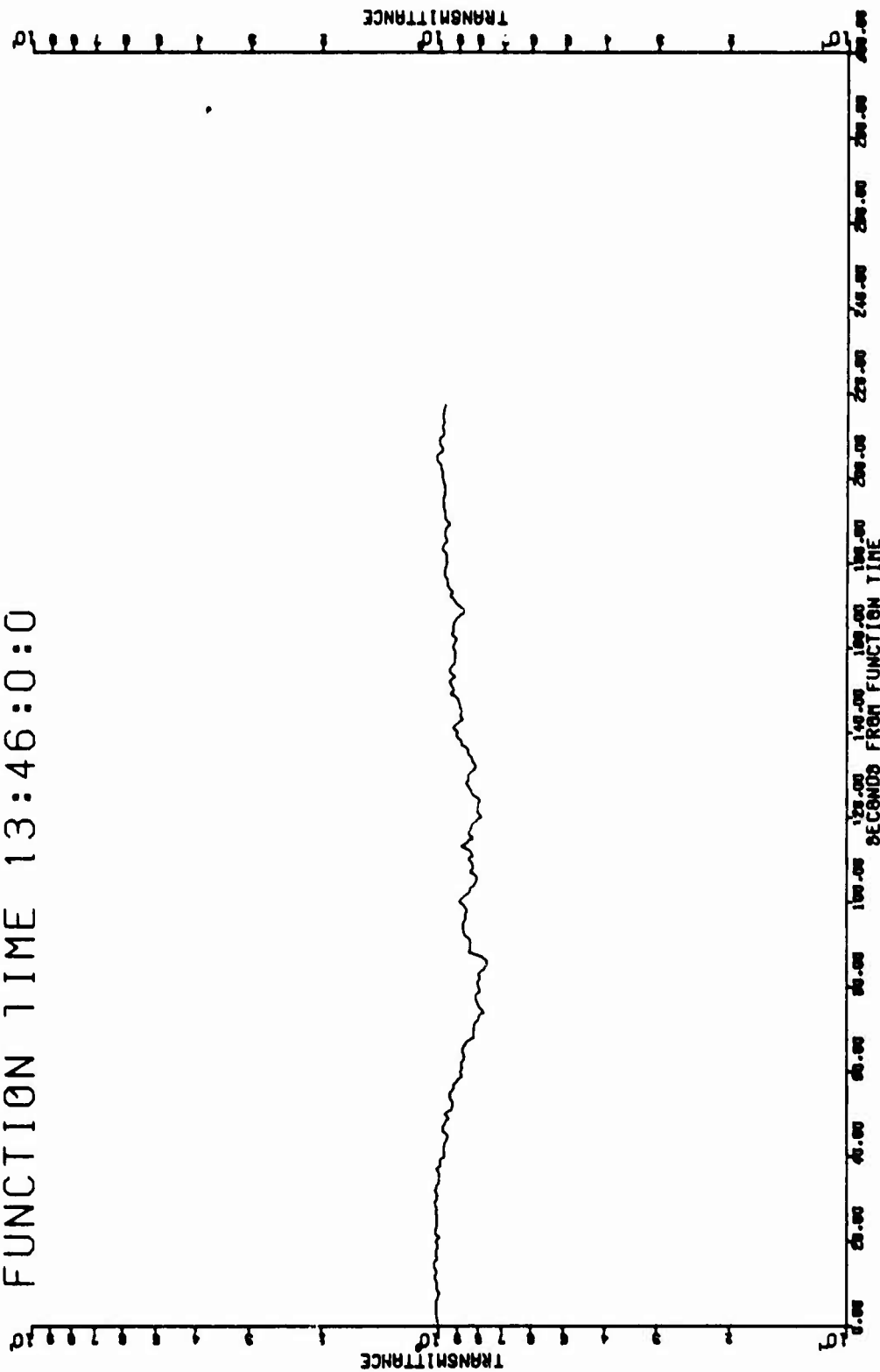
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



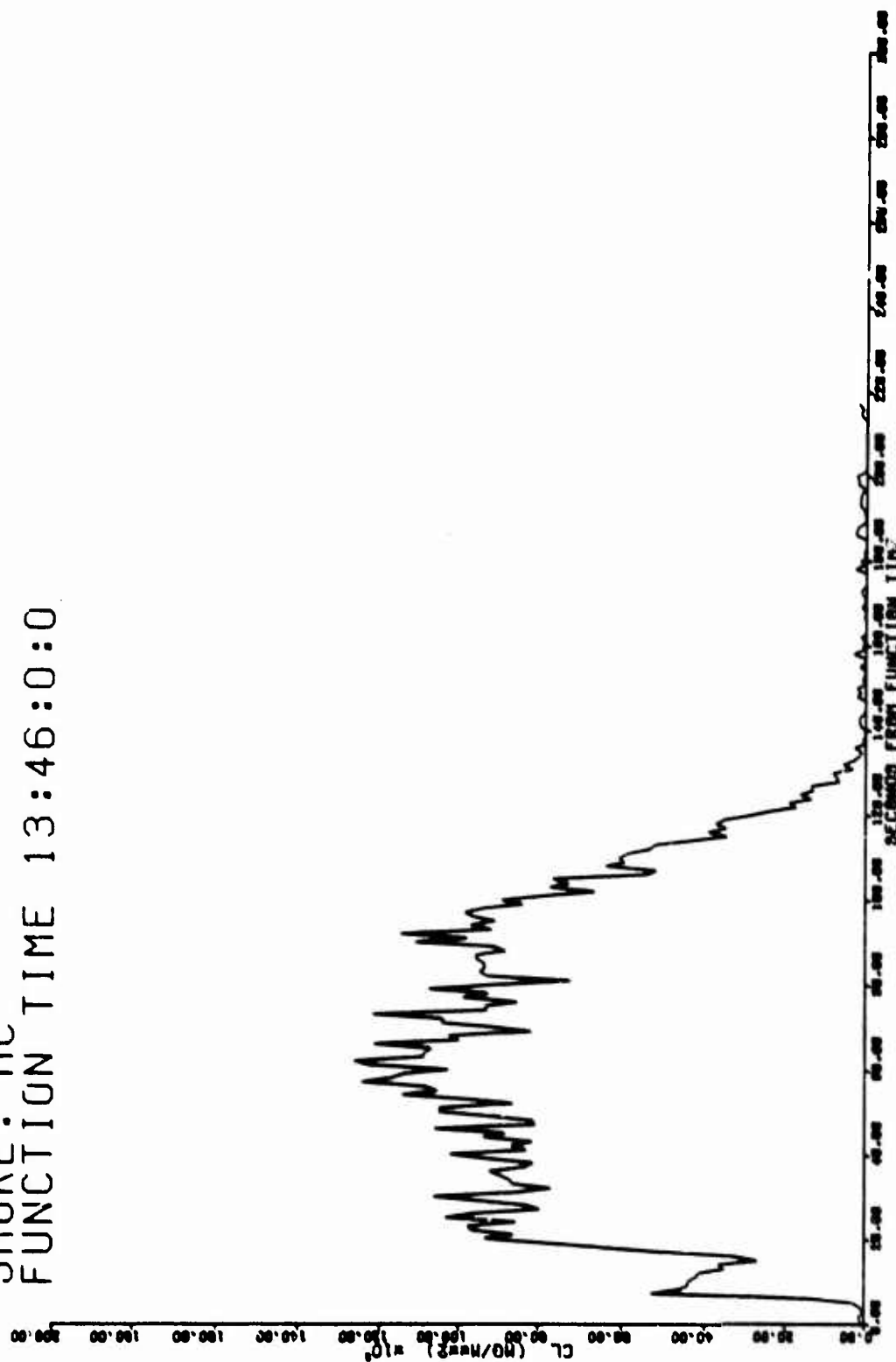
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #3 (DP1-002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:0:0



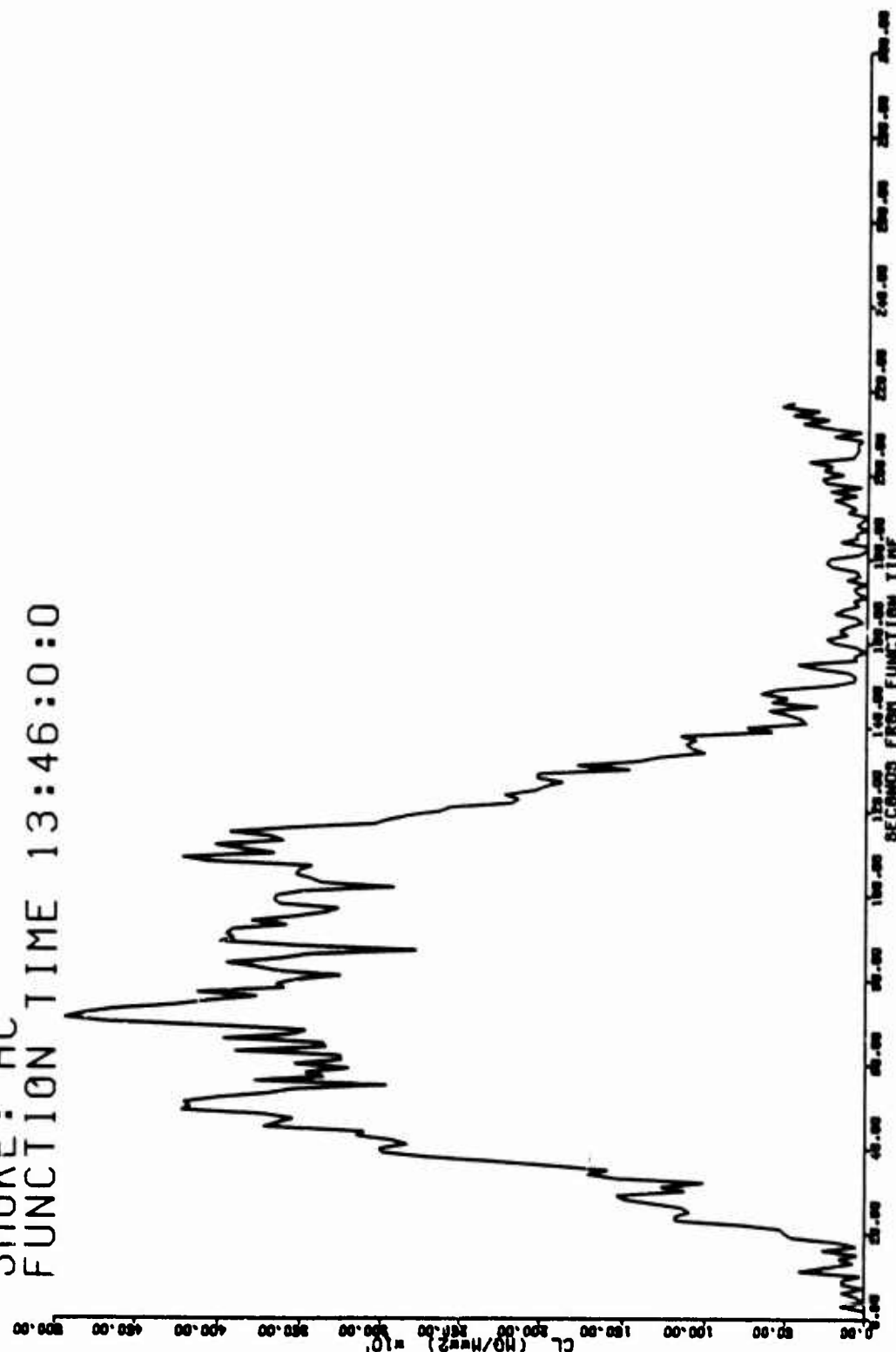
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #3 (DP1-002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:0:0



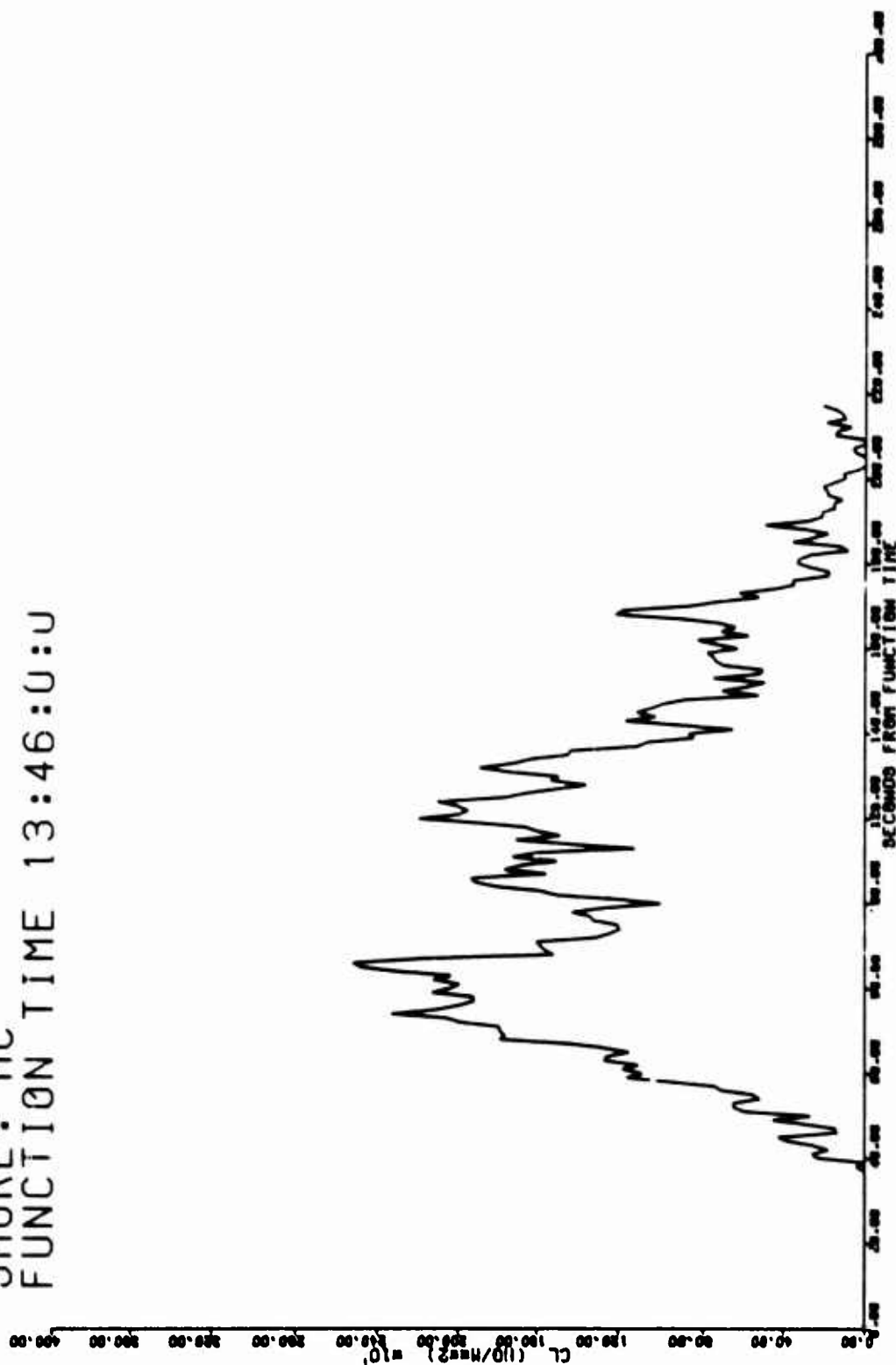
CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



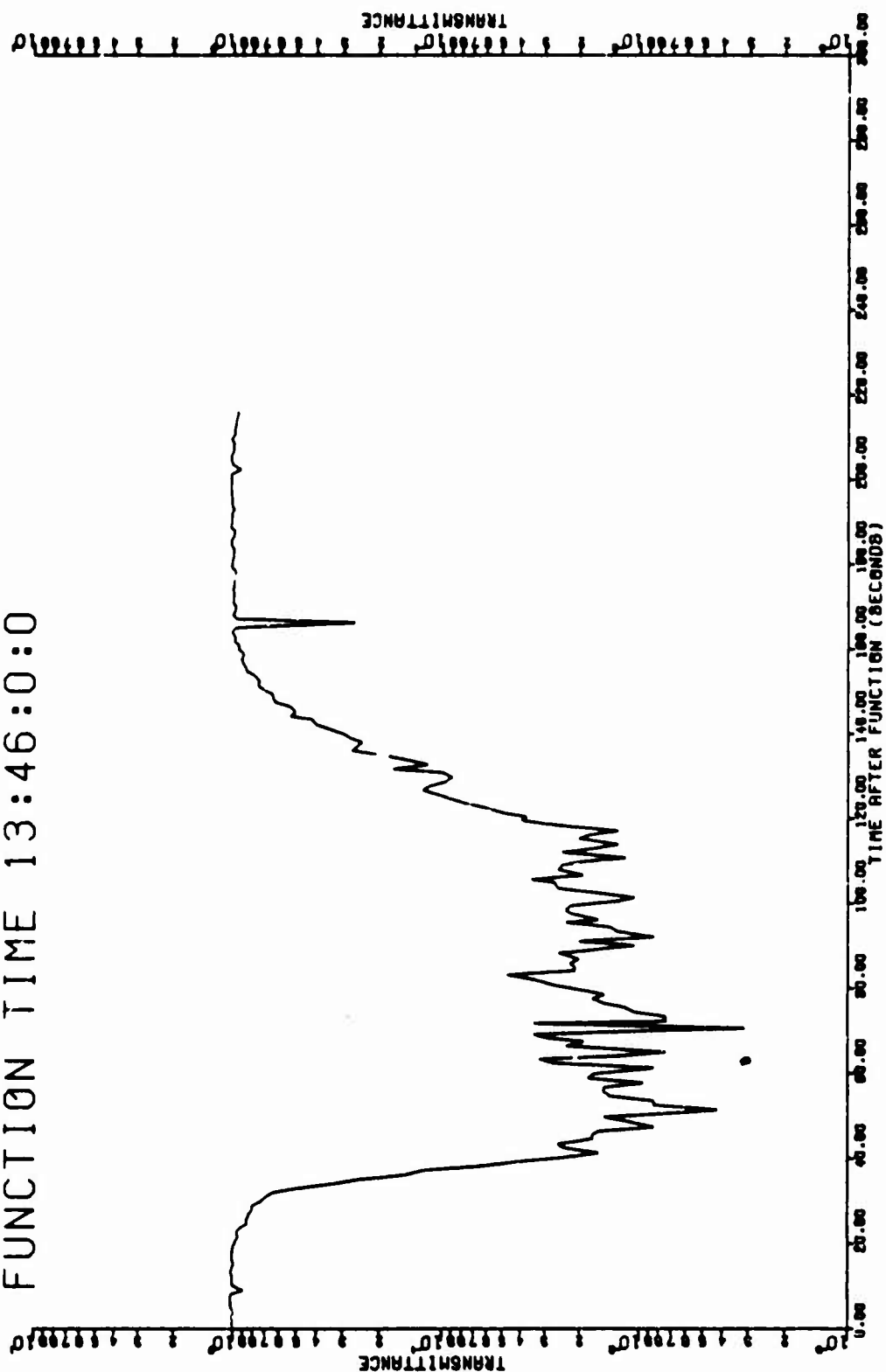
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:00:U



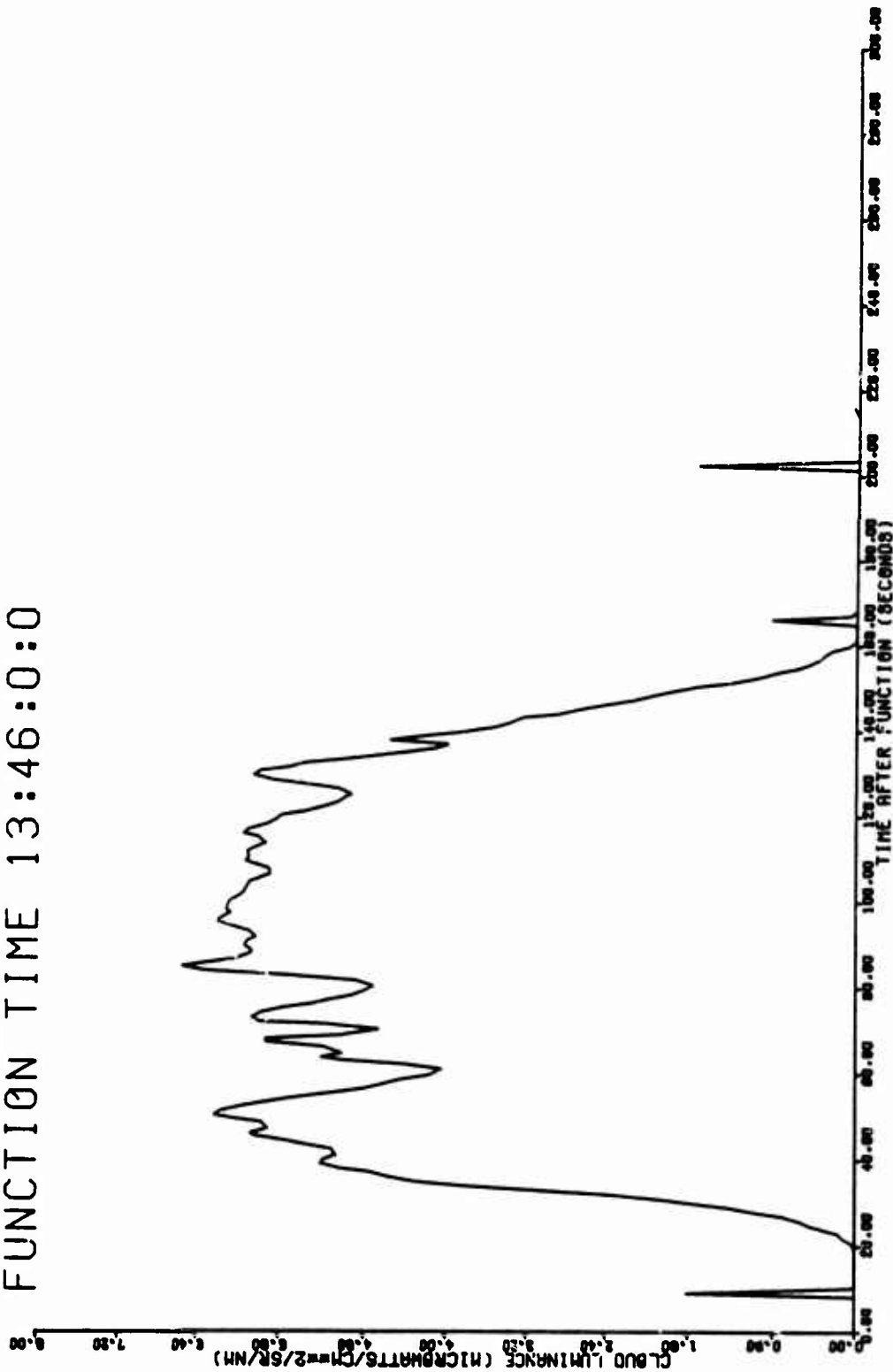
CL VA' UES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #3 (DP1-002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:0:0



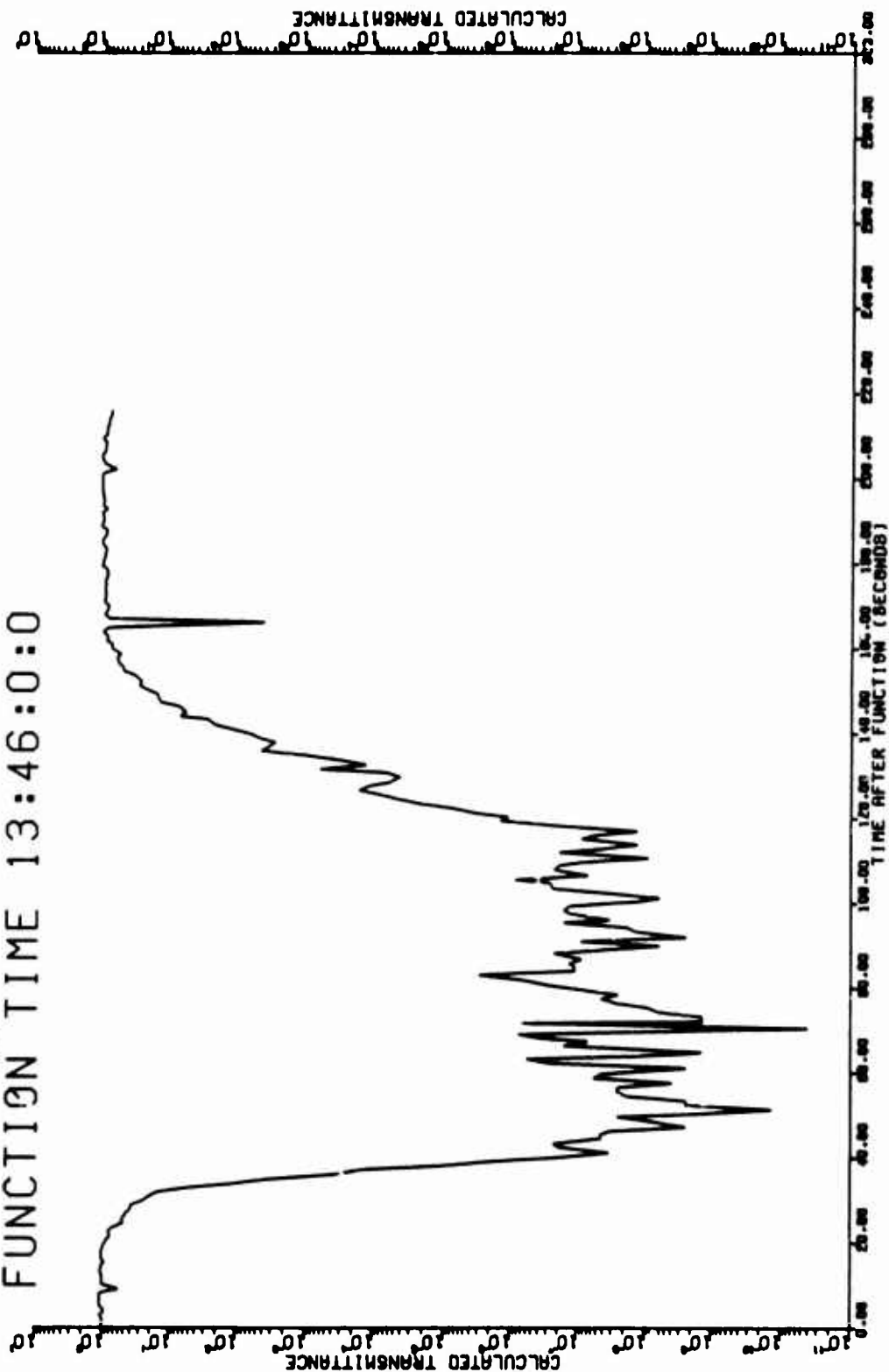
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



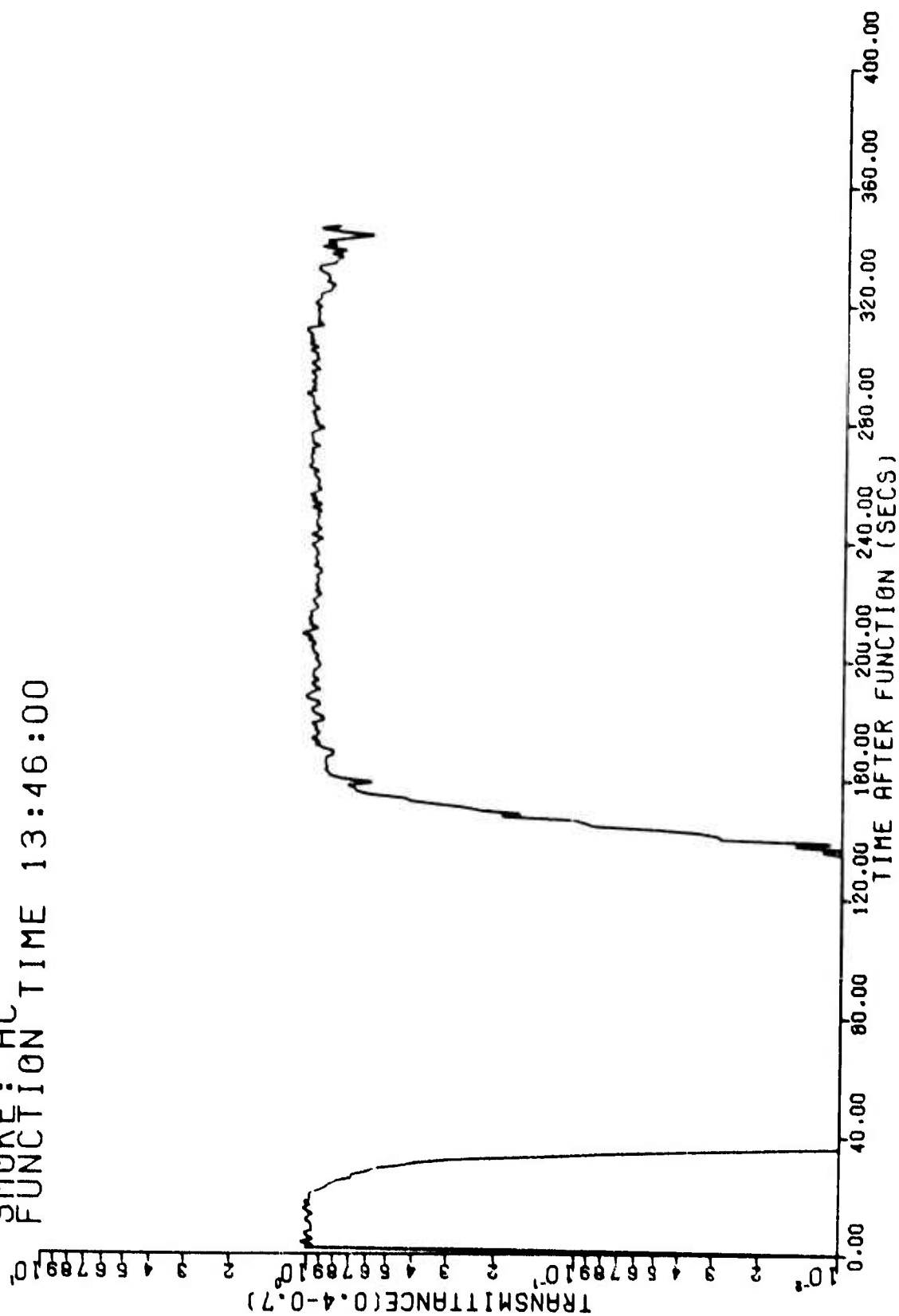
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



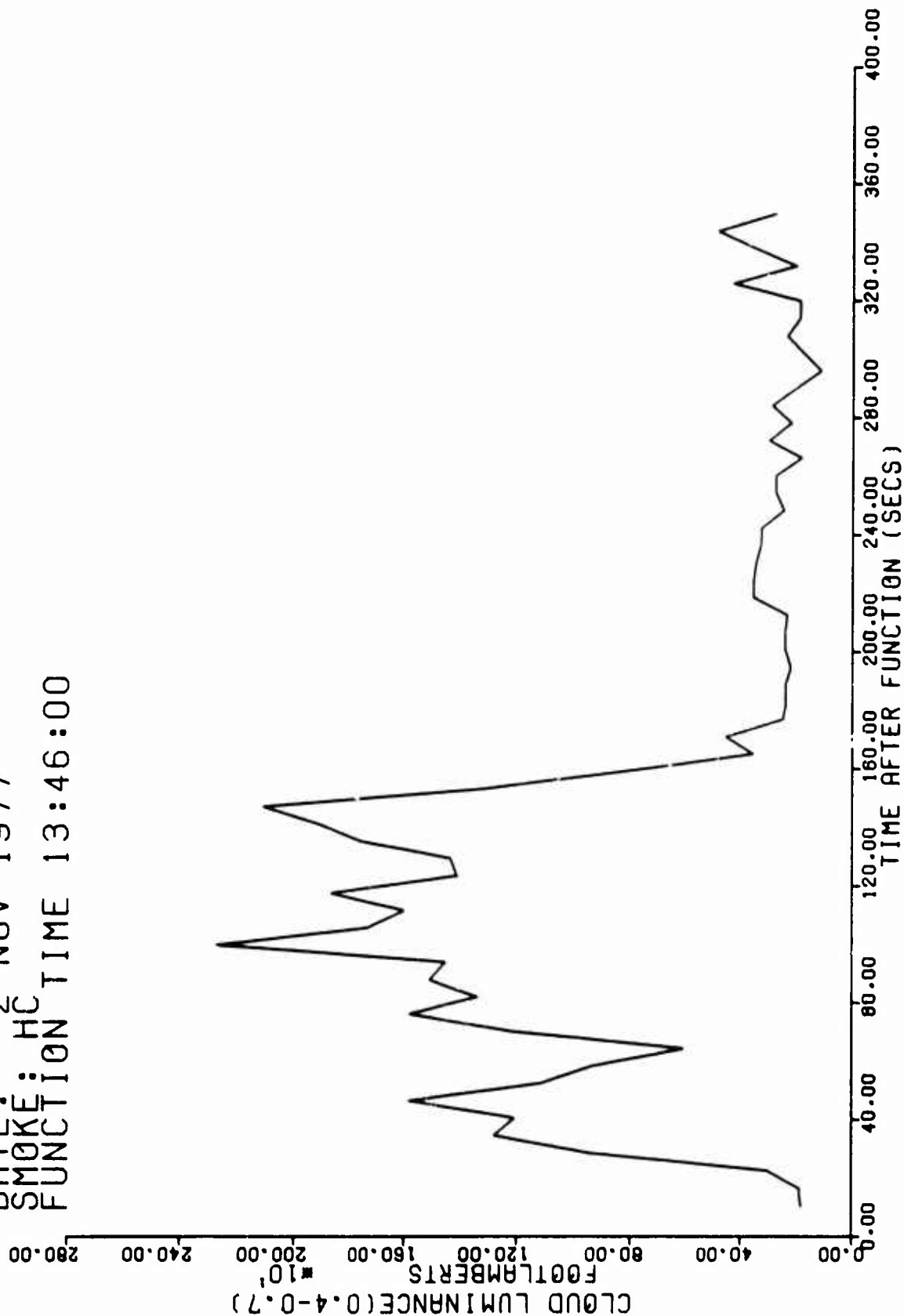
CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 3, (DP-1002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:00



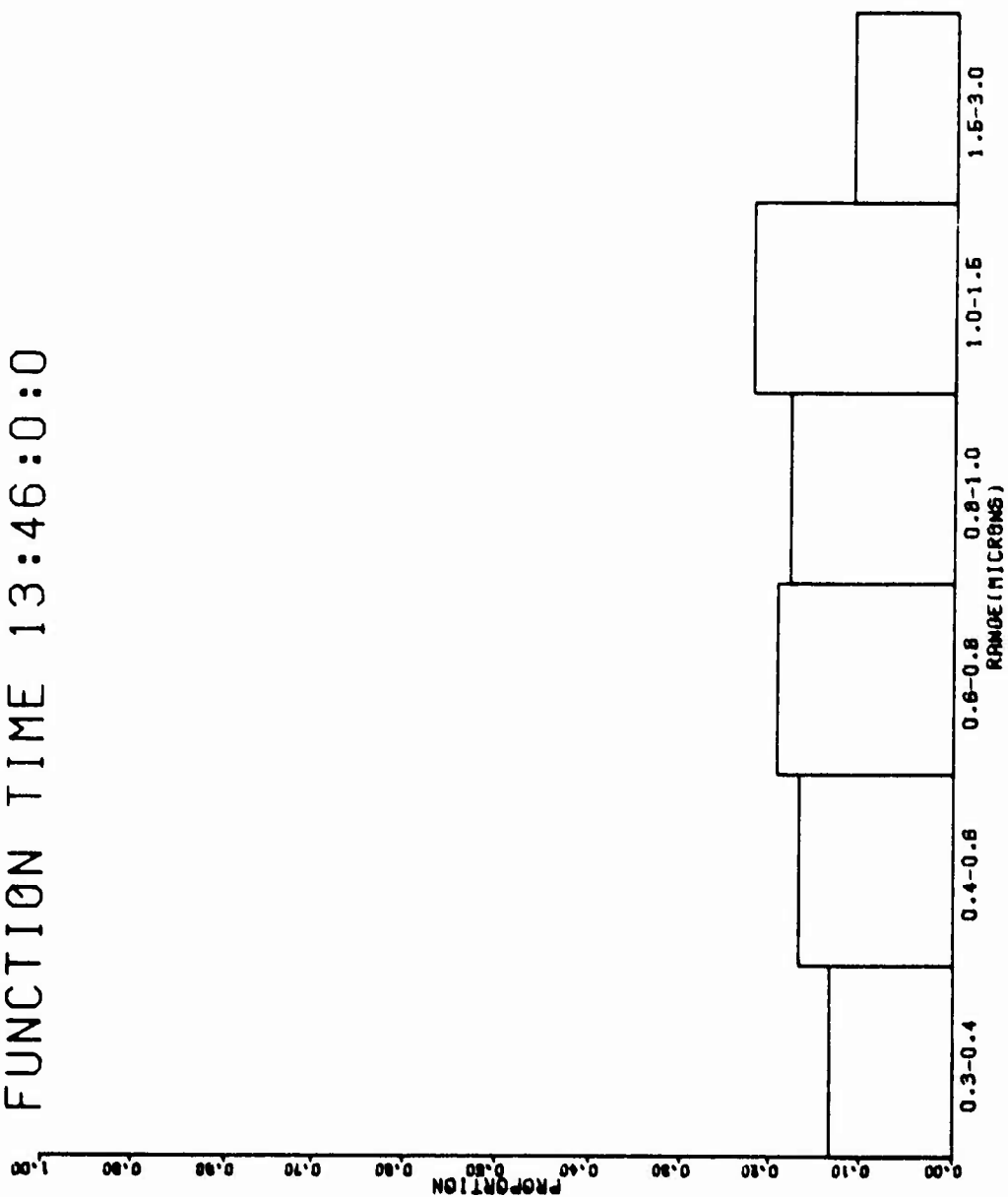
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW G

TRIAL 3, (DP-1002)
DATE: 2 NOV 1977
SMOKE: HC
FUNCTION TIME 13:46:00



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

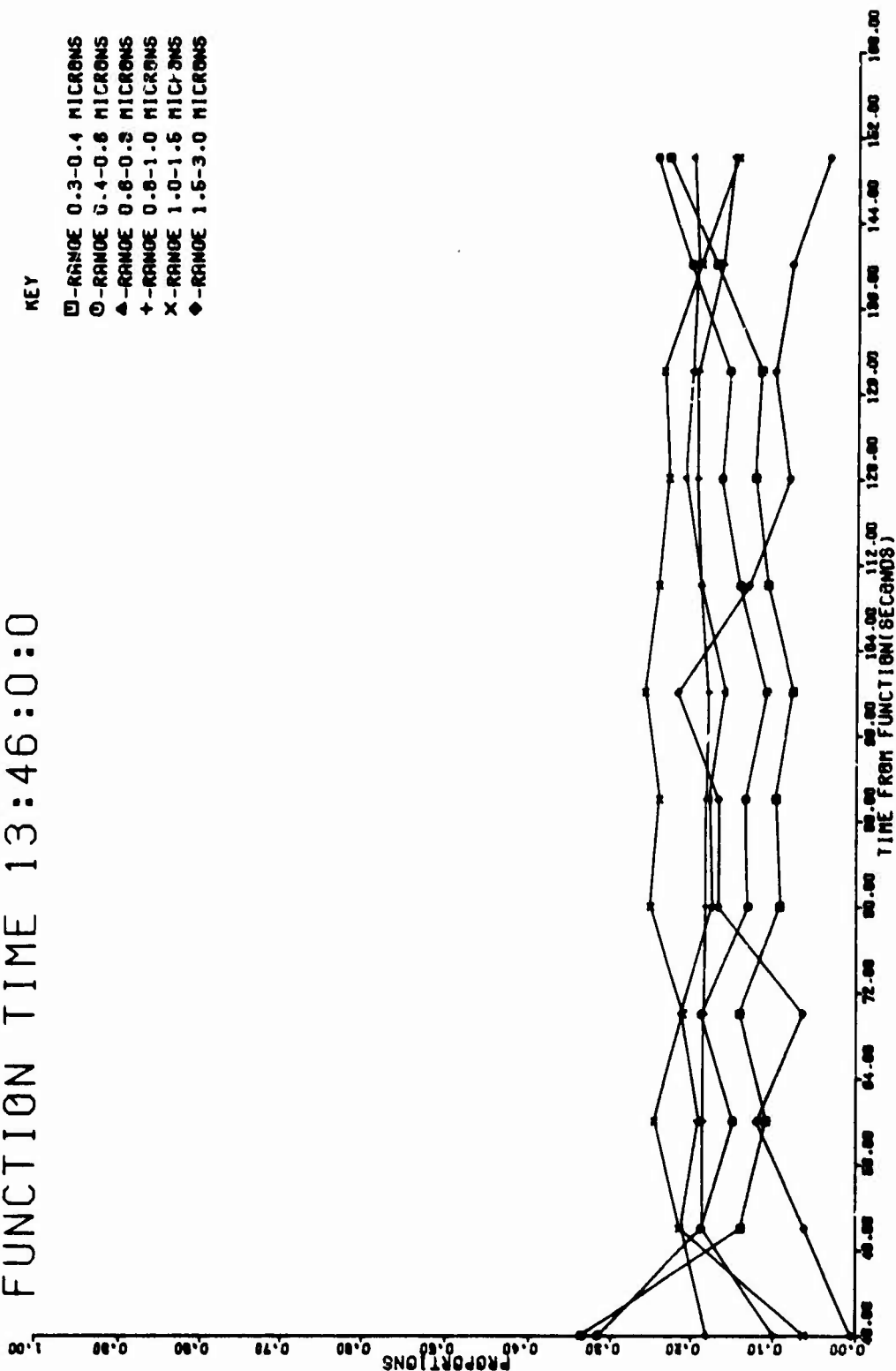
TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0



PARTICLE SIZE DISTRIBUTION BASED ON NUMBER

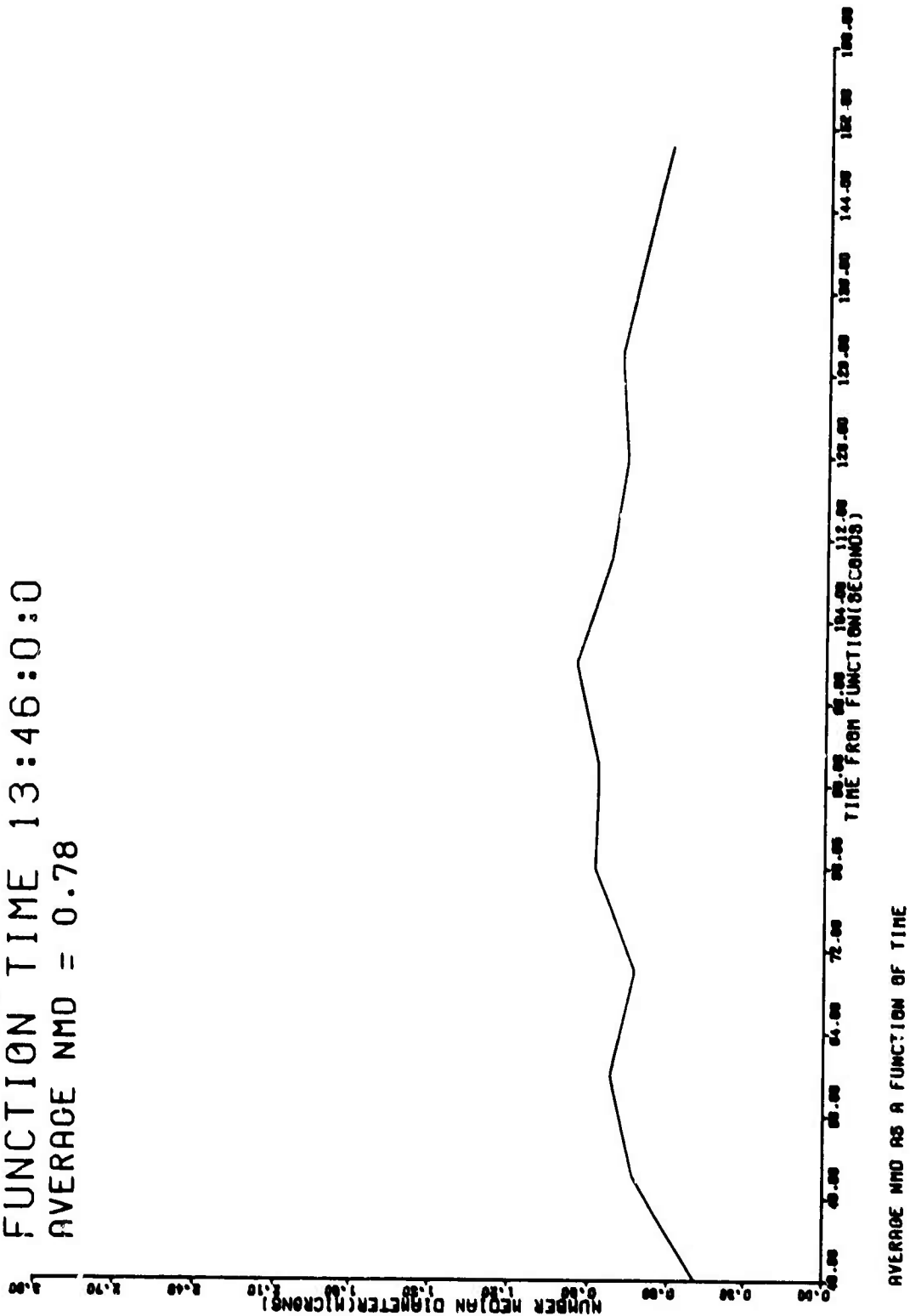
TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0

KEY
 □ - RANGE 0.3-0.4 MICRONS
 ○ - RANGE 0.4-0.6 MICRONS
 ▲ - RANGE 0.6-0.8 MICRONS
 + - RANGE 0.8-1.0 MICRONS
 x - RANGE 1.0-1.6 MICRONS
 ◆ - RANGE 1.6-3.0 MICRONS



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #3 (DP1-002)
 DATE: 2 NOV 1977
 SMOKE: HC
 FUNCTION TIME 13:46:0:0
 AVERAGE NMD = 0.78



APPENDIX B-I-4

TRIAL DP1-002-T-5 (WP SMOKE) 26 SEP 1977

SUMMARY OF TEST DATA	B-I-4-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-4-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-4-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-4-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-4-11
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-4-12
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-4-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-4-14
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-4-15
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-4-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-4-17
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-4-18
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-4-19
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-4-20
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-4-21

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	ND
FIGURE:	PARTICLE SIZE DISTRIBUTION	ND
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	ND
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	ND

SUMMARY OF TEST DAY DATA

Trial: 5

Date: 26 Sep 77

Time: 1248:02 MDT

Wind Direction (Transport) (degrees) (4m)	271
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.9
Temperature at 2-meters, Trial Time (T, °C)	27.2
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	ND
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	29.9
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.13
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	18
Solar Azimuth (deg)	165.8
Solar Altitude (deg)	47.6
Air Density - ρ (kg m ⁻³)	1.01024
Solar Radiation (Langleys per minute)	1.205
Barometric Pressure (millibars)	864.1
Visibility (km)	113
Reflectivity, OD Target	0.21
Haze (footlamberts)	37
Brightness, Background (footlamberts)	1560
Brightness, White Target (footlamberts)	1350
Brightness, OD Target	408
Percent Opaque Cloud Cover	1

Munitions/Submunitions Used (WP, 105mm) 1

Number of Munitions/Submunitions Functioned 1

Particle Size Range (micron)

(0.3 - 0.4) ND

(0.4 - 0.6) ND

(0.6 - 0.8) ND

(0.8 - 1.0) ND

(1.0 - 1.5) ND

(1.5 - 3.0) ND

$\text{Log}_{10}\text{NMD}$ ND

$\sigma\text{Log}_{10}\text{NMD}$ ND

NMD ND

MMD ND

Initial Cloud Dimensions (Meters)

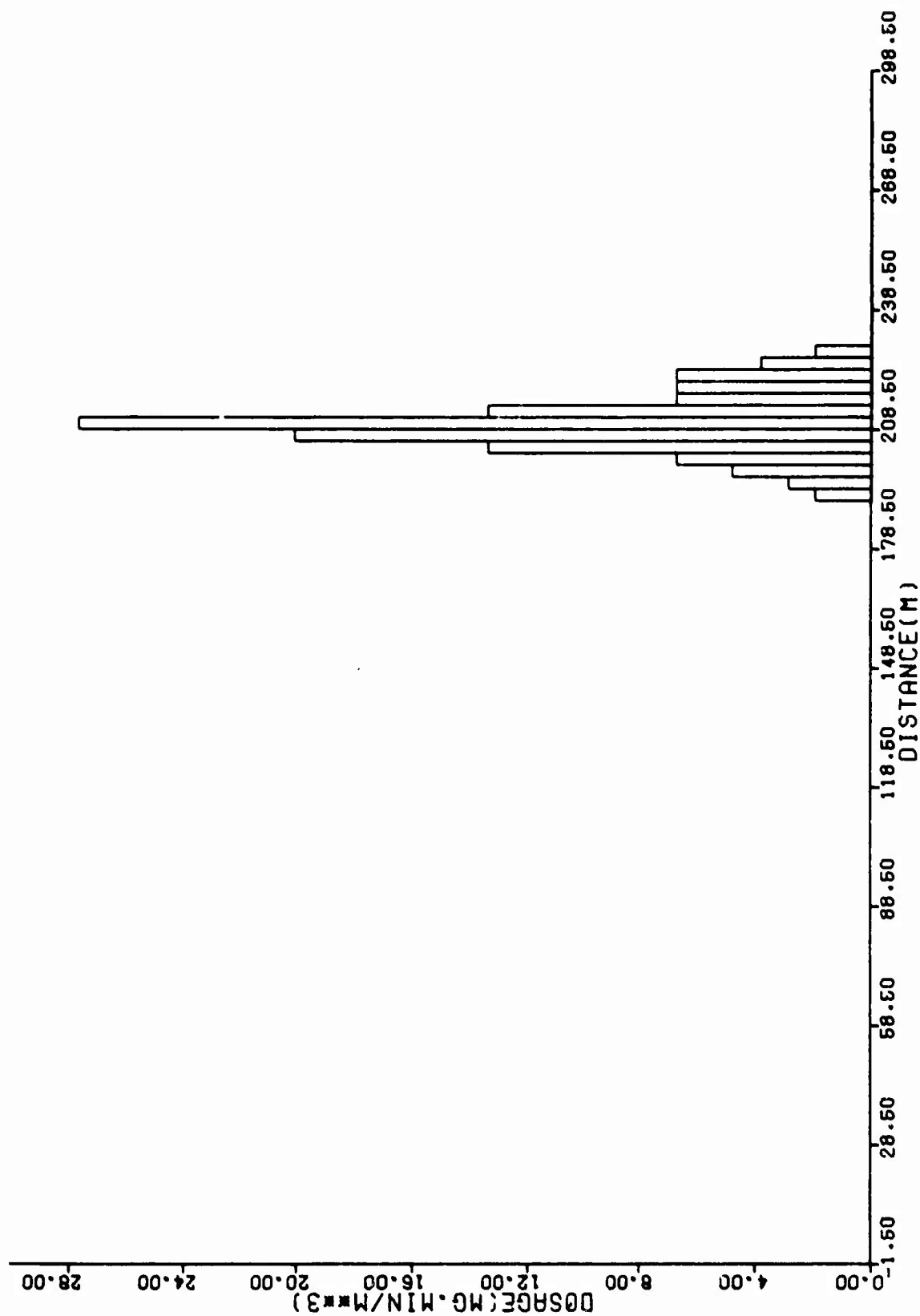
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1248:02	4	7	4
1248:12	38	15	6
1248:22	45	27	19
1248:32	53	47	27
1248:42	Plume aloft		
↓			

SKY BRIGHTNESS

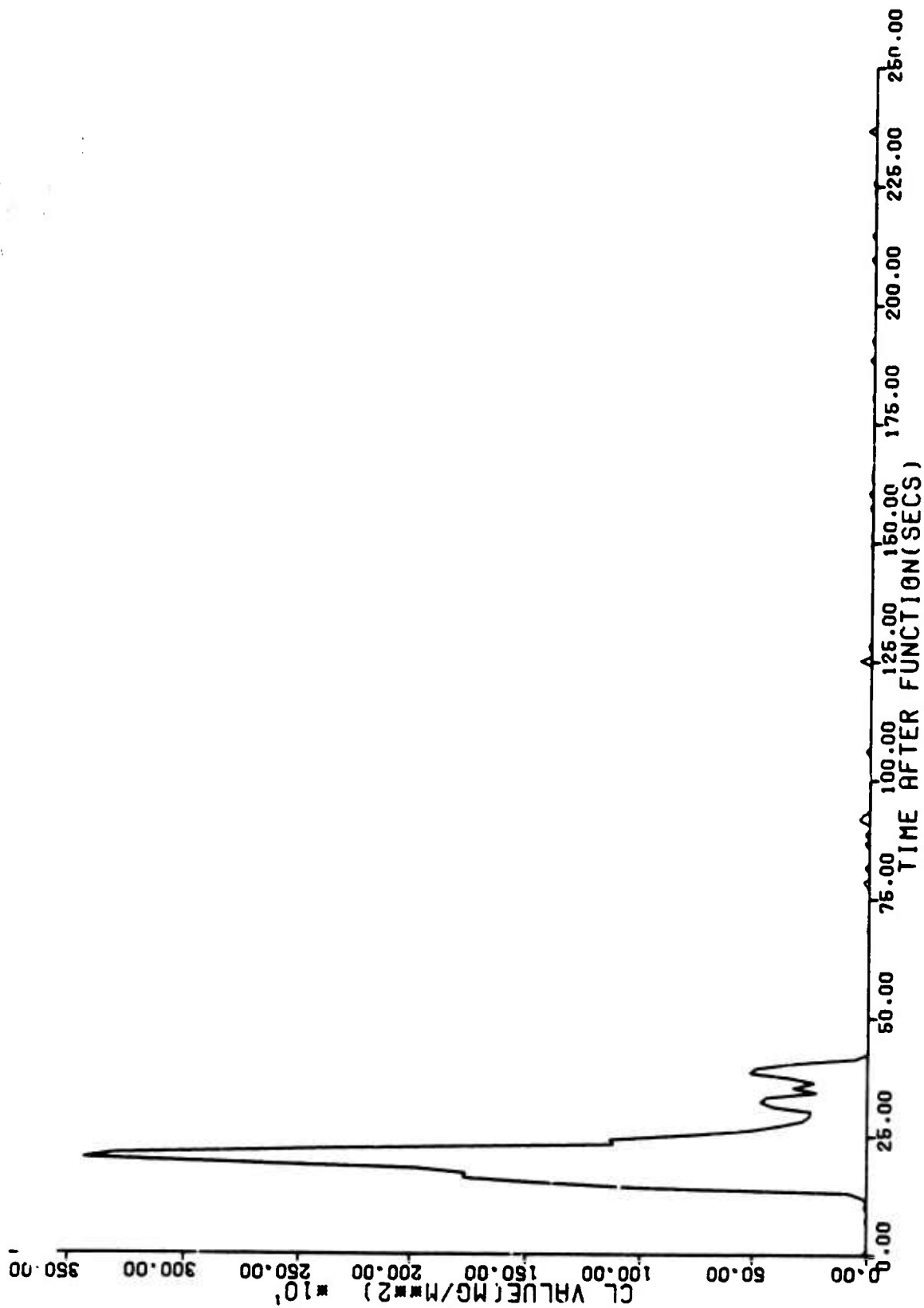
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	816
5	1300
10	1300
15	1300
20	1640
25	1640
30	1640
35	1984
40	1984
45	1640

Viewing azimuth 240° except 255° at 0 degrees elevation

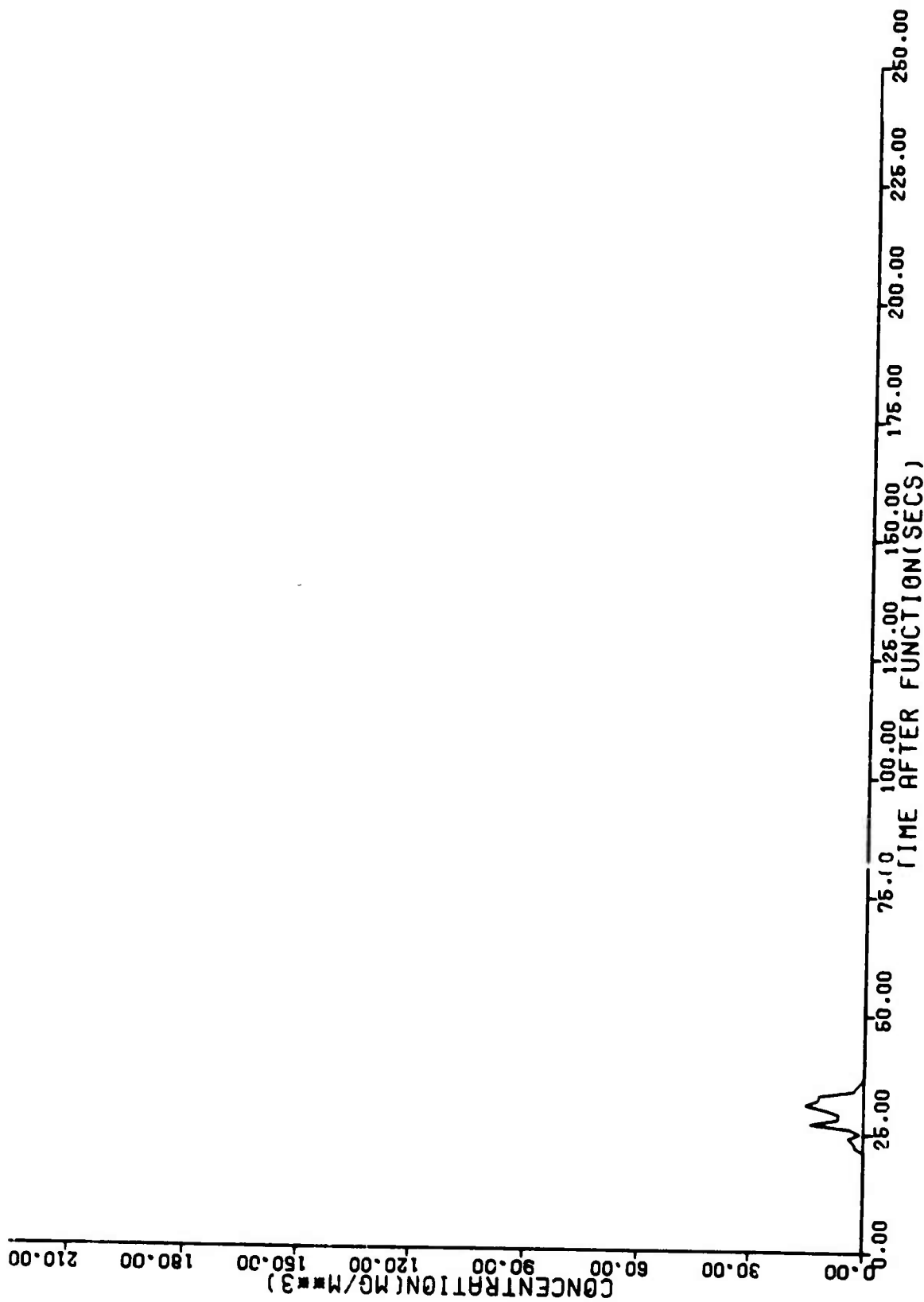


TRIAL 5 (DP-1002), 26 SEP 1977, 12:48:02, WP SMOKE



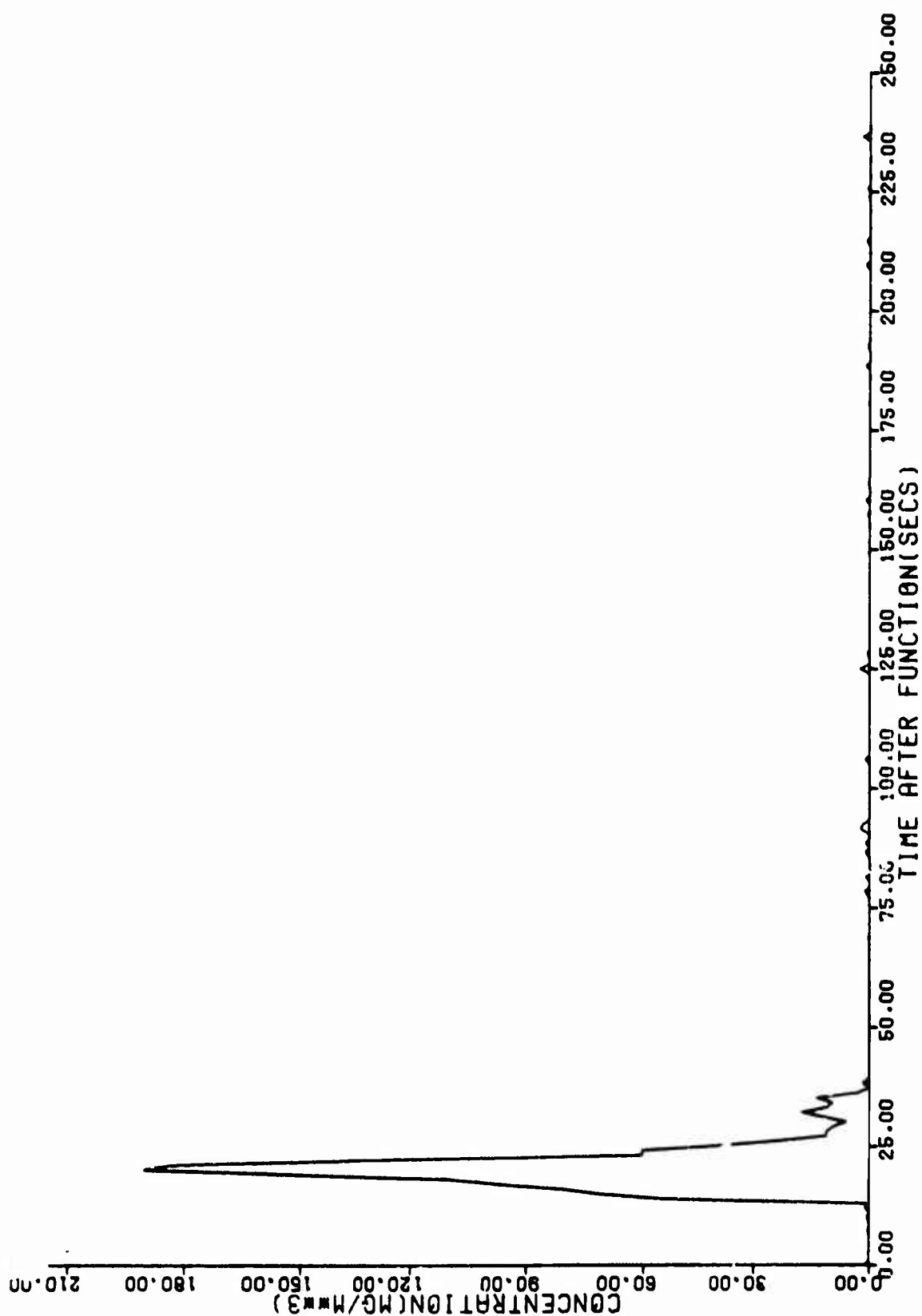
TRIAL 5 (DP-1002), 26 SEP 1977, 12:48:02, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



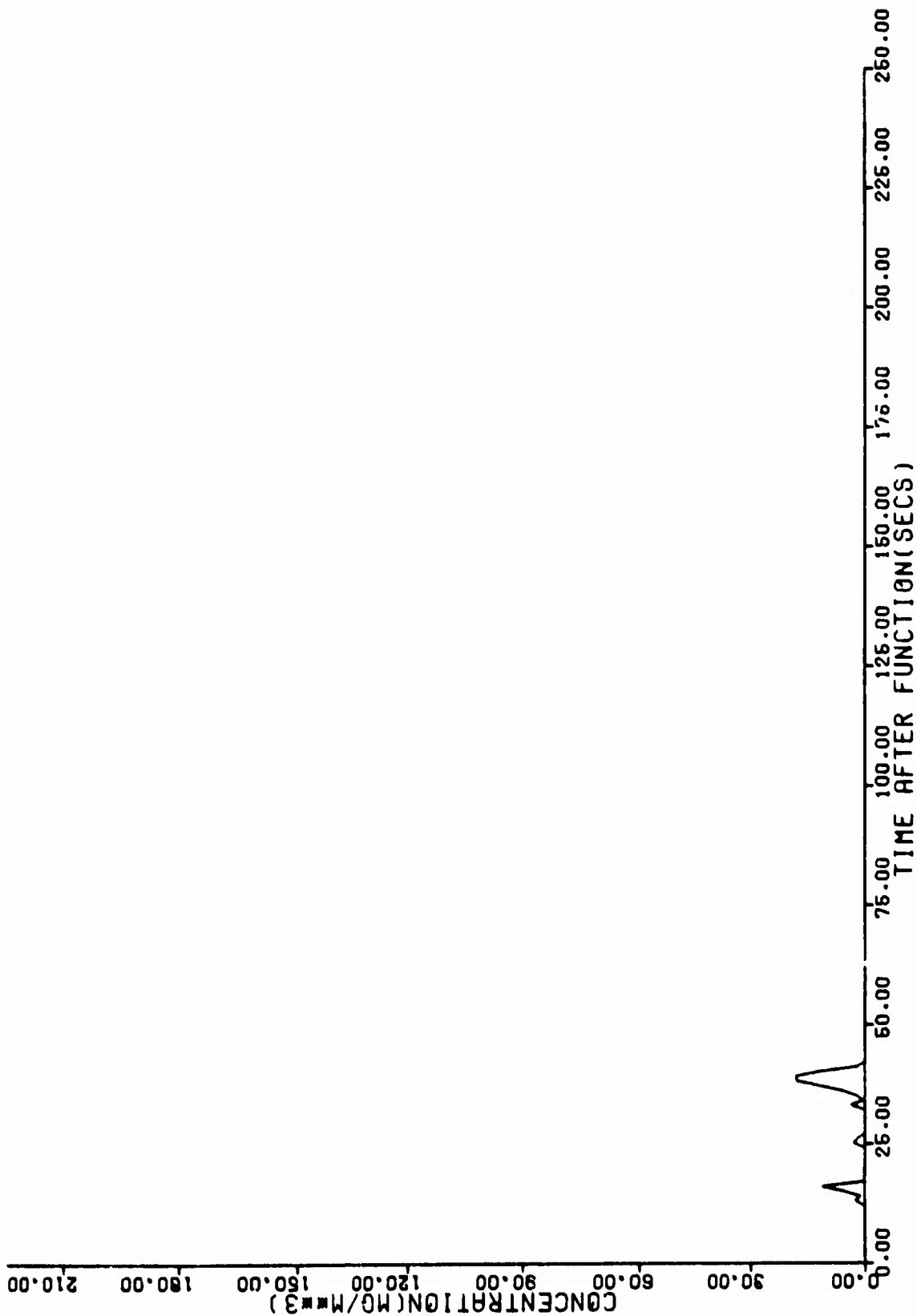
TRIAL 5 (DP-1002), 26 SEP 1977, 12:48:02, WP SMOKE

EROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 5 (DP-1002), 26 SEP 1977, 12:48:02, WP SMOKE

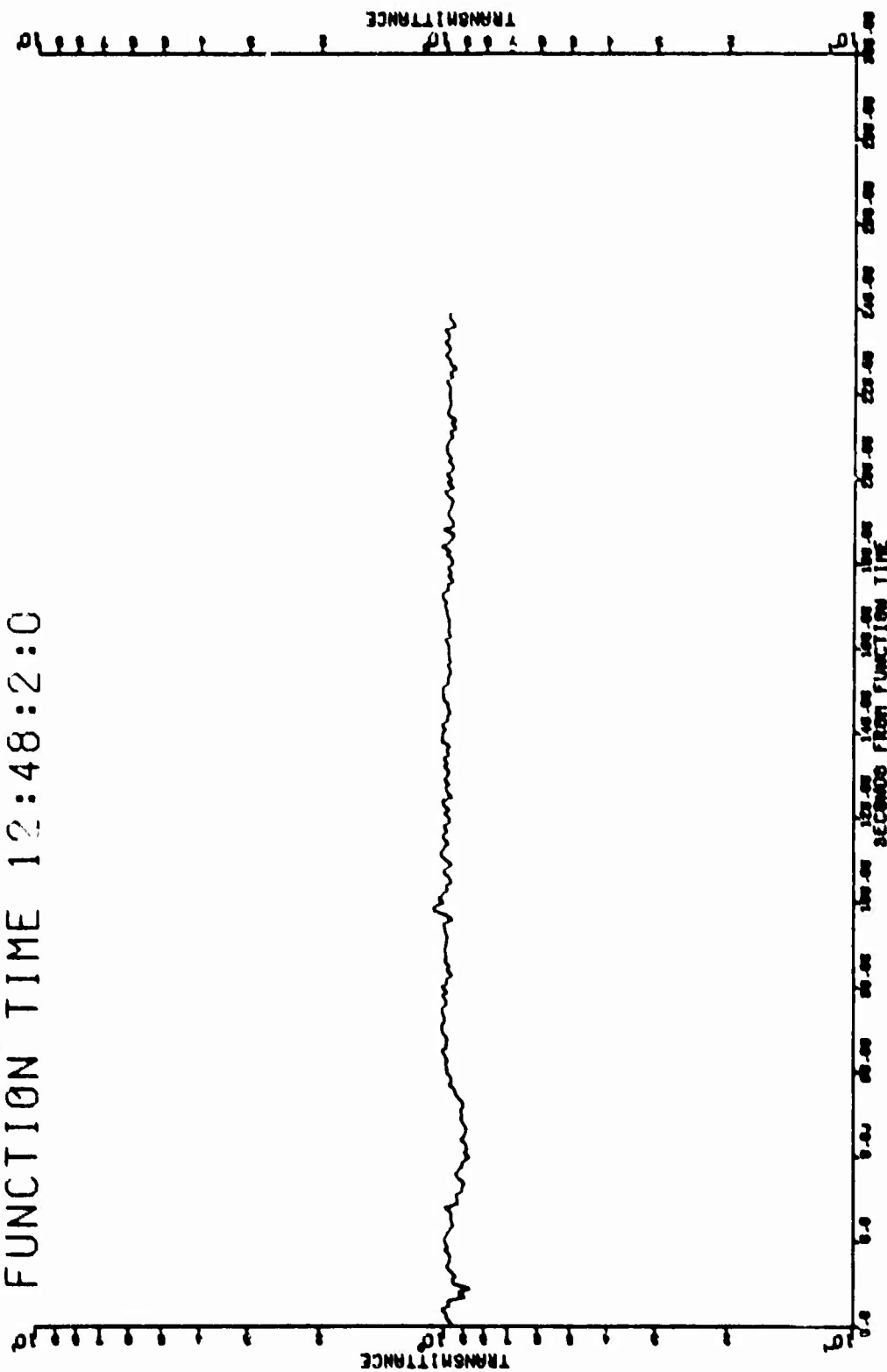
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00



TRIAL 5 (DP-1002), 26 SEP 1977, 12:48:02, WP SMOKE

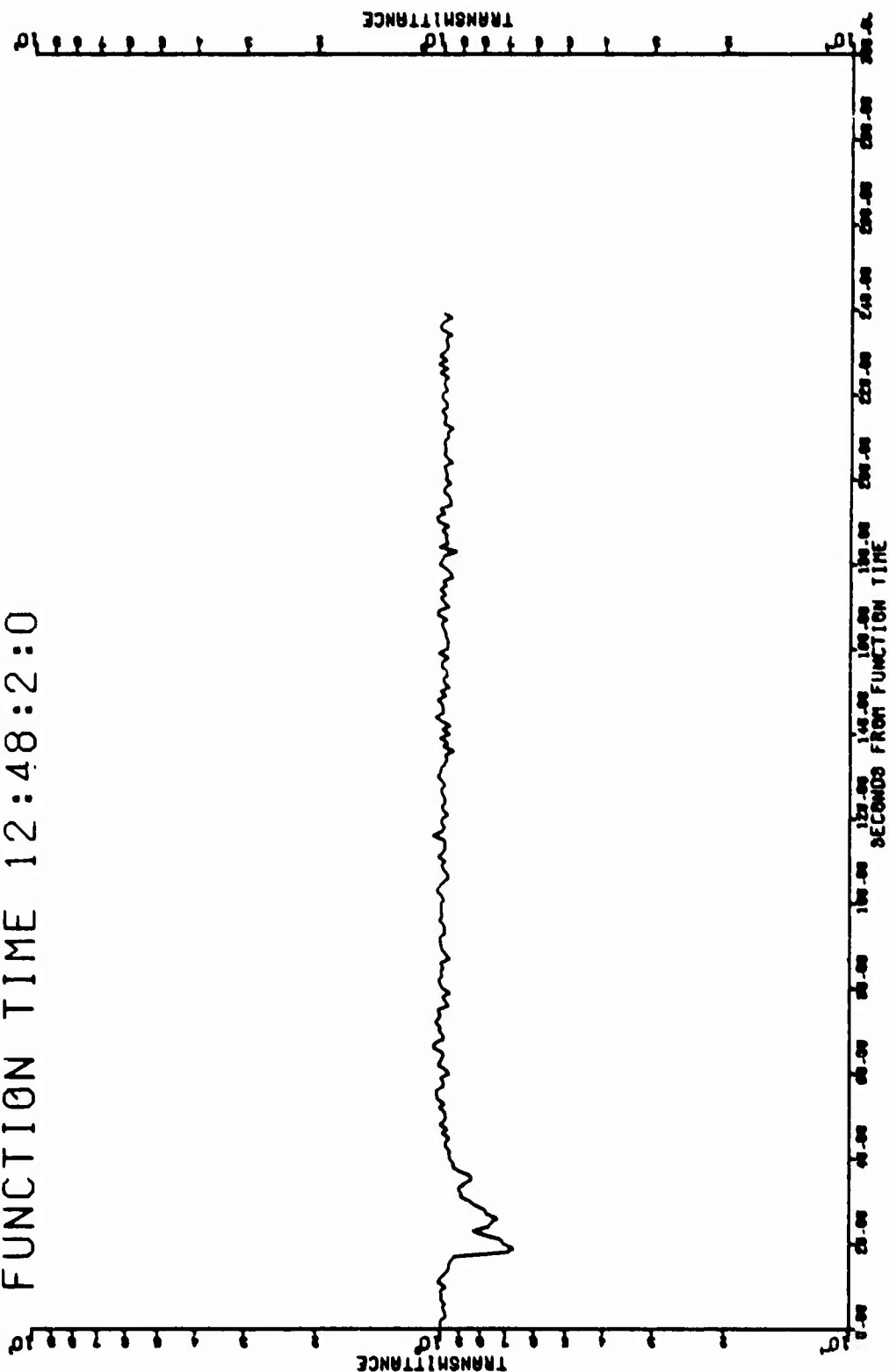
NEROSOL PHOTOMETER #17, X=0.00, Y=228.00, Z=0.00

TRIAL #5 (DP1-002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:2:0



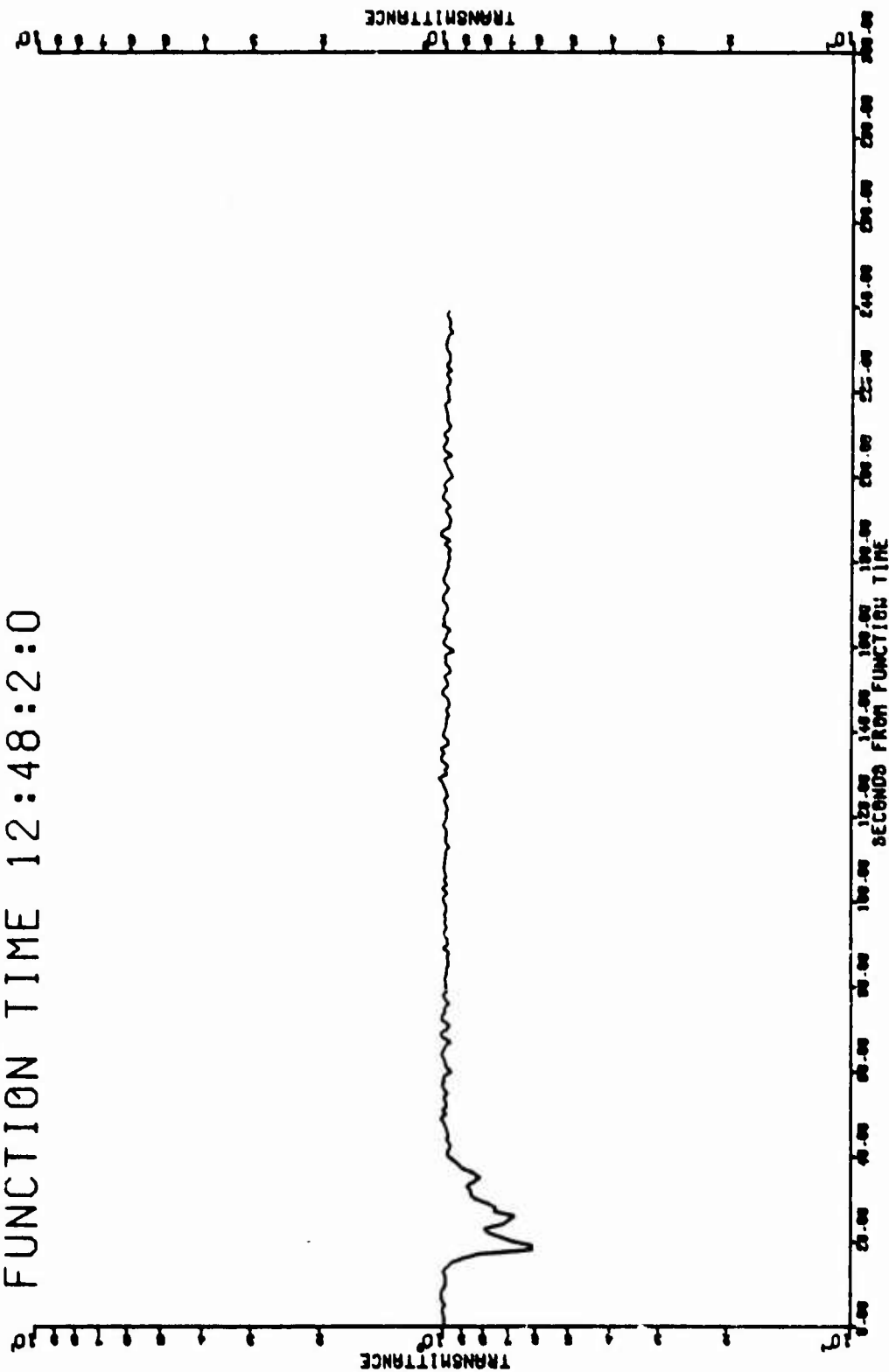
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #5 (DP1-002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:2:0



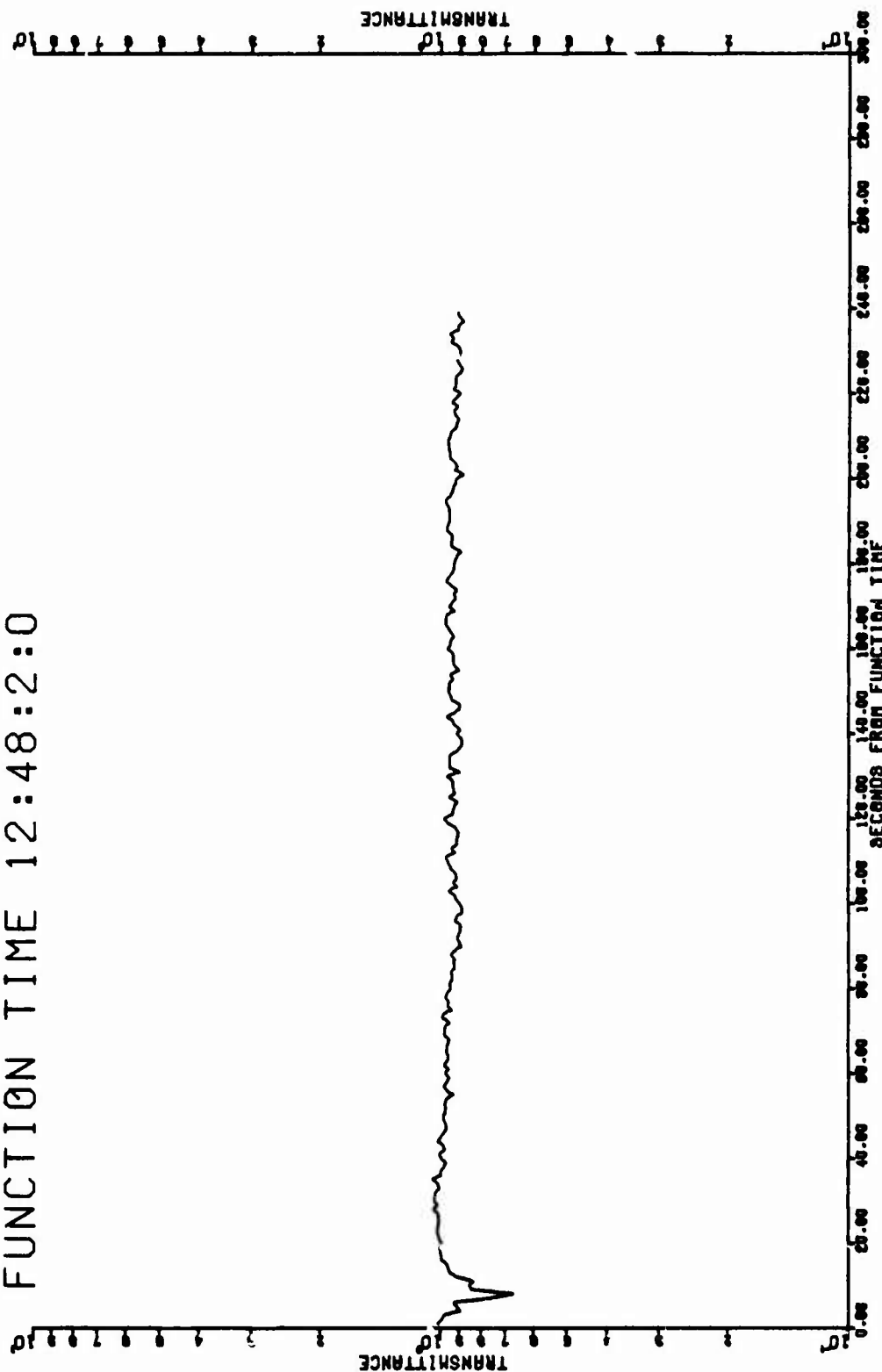
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #5 (DP1-002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:2:0



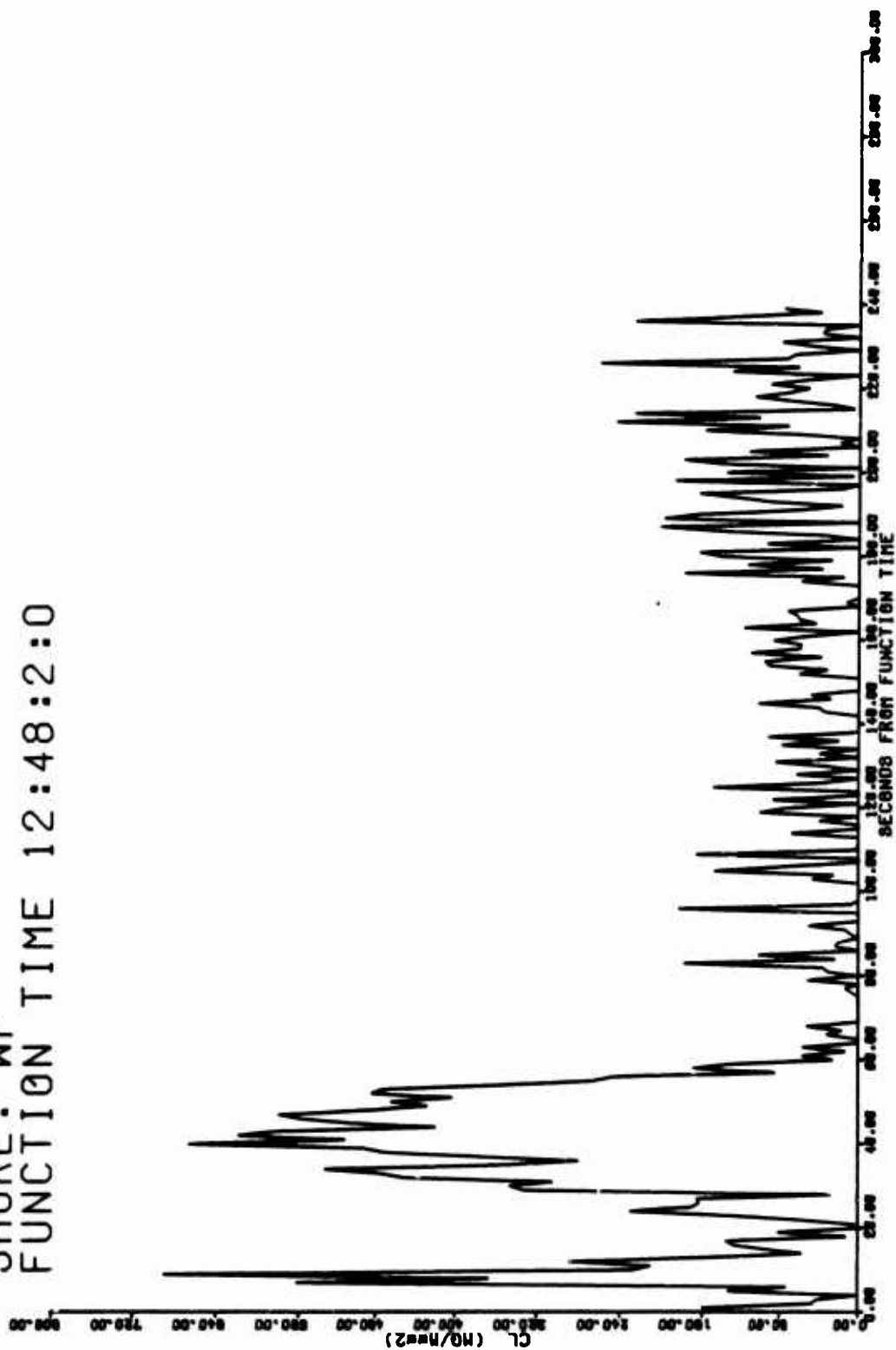
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #5 (DP1-002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:2:0



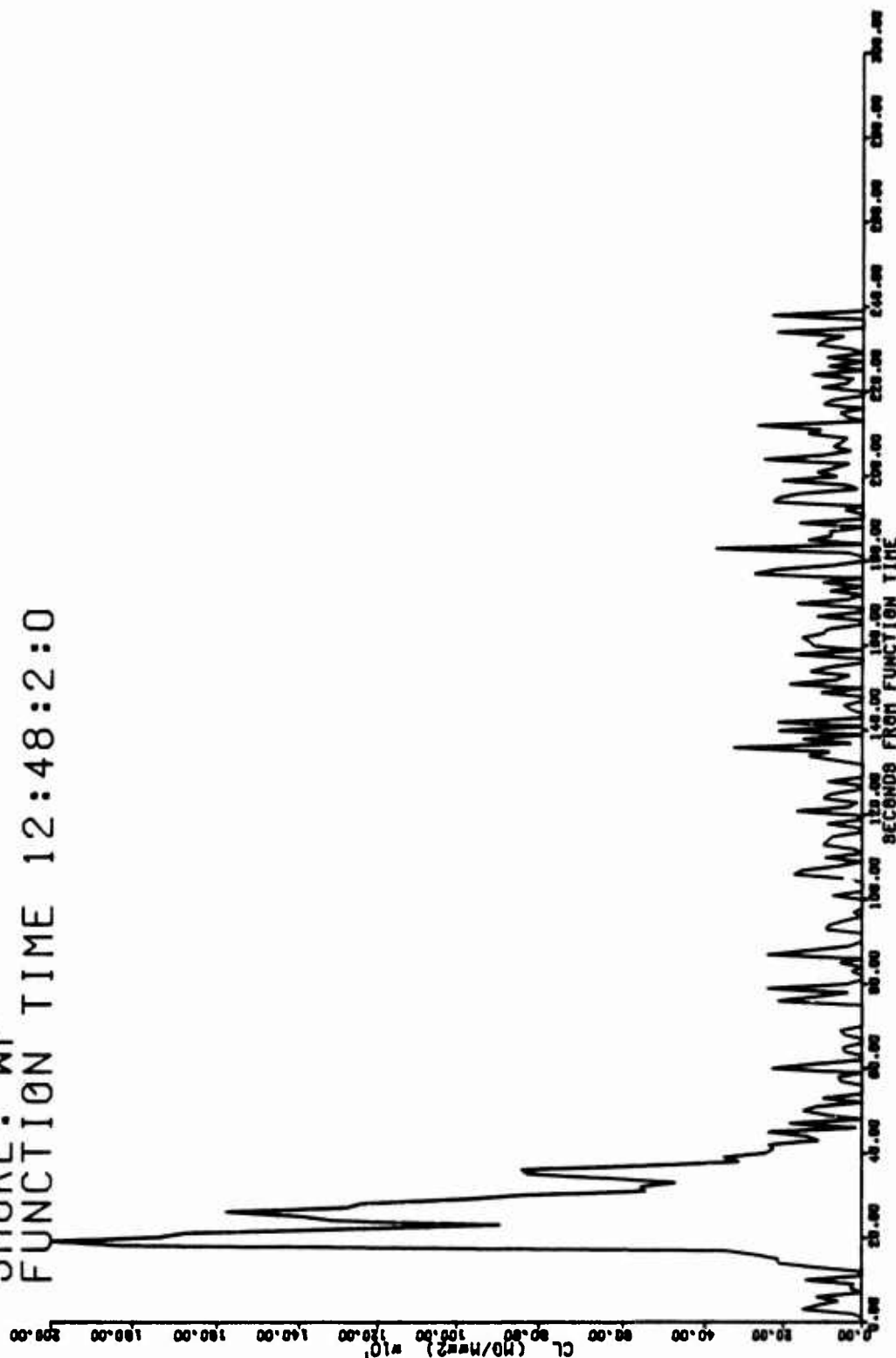
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #5 (DP1-002)
 DATE: 26 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:48:2:0



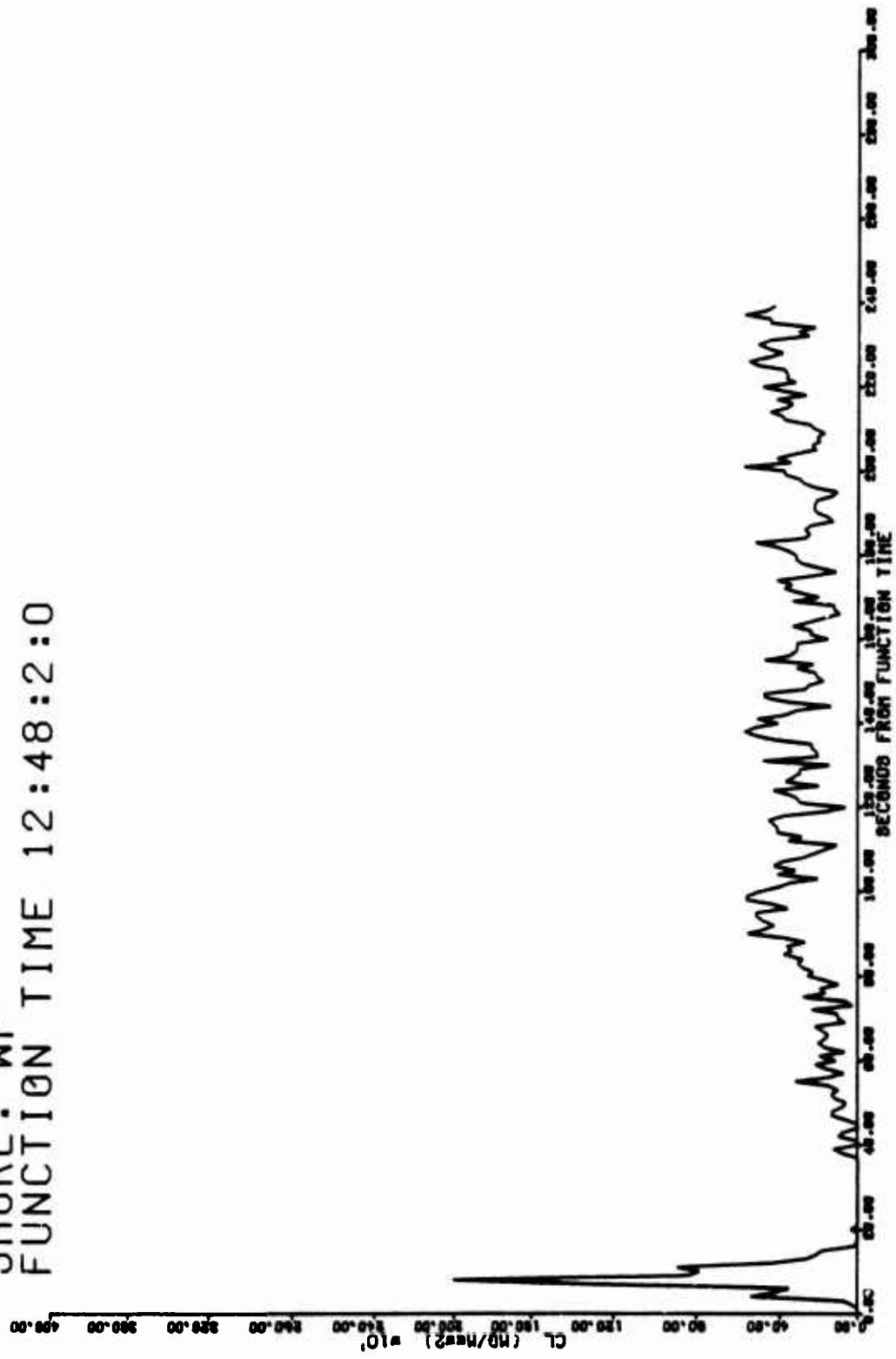
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #5 (DP1-002)
 DATE: 26 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:48:2:0



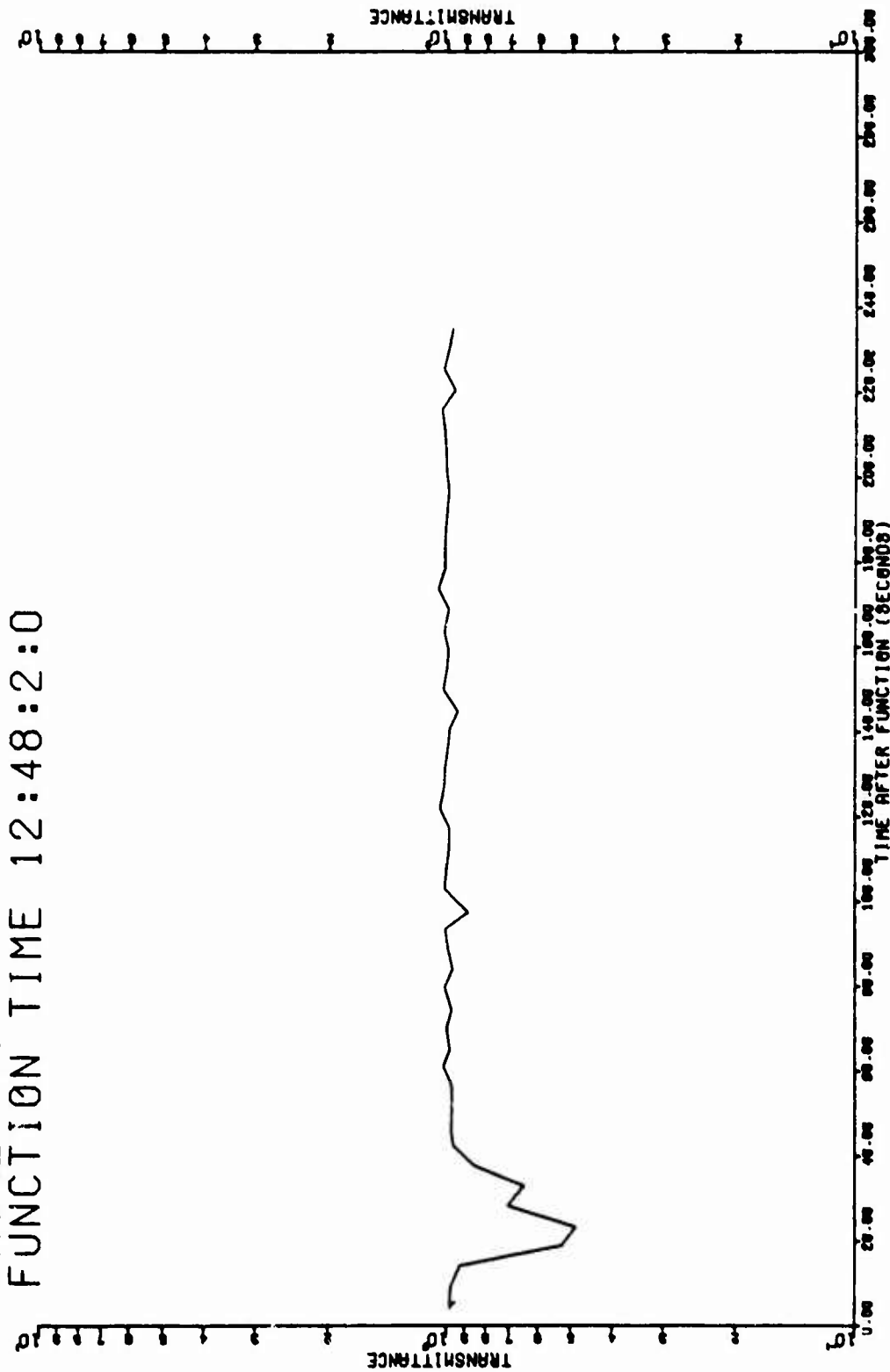
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #5 (DP1-002)
 DATE: 26 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:48:2:0



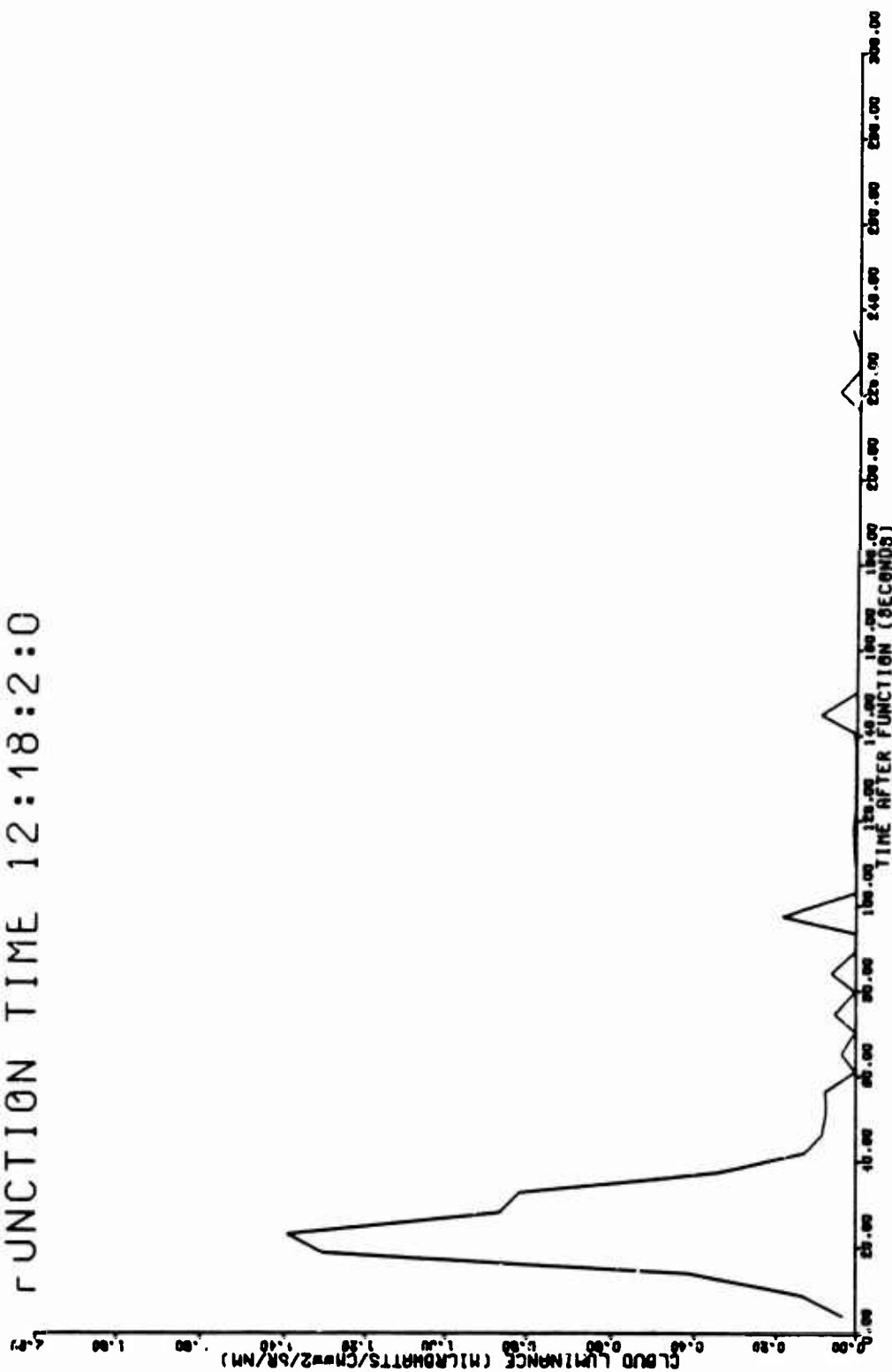
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #5 (DP1-002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:2:0



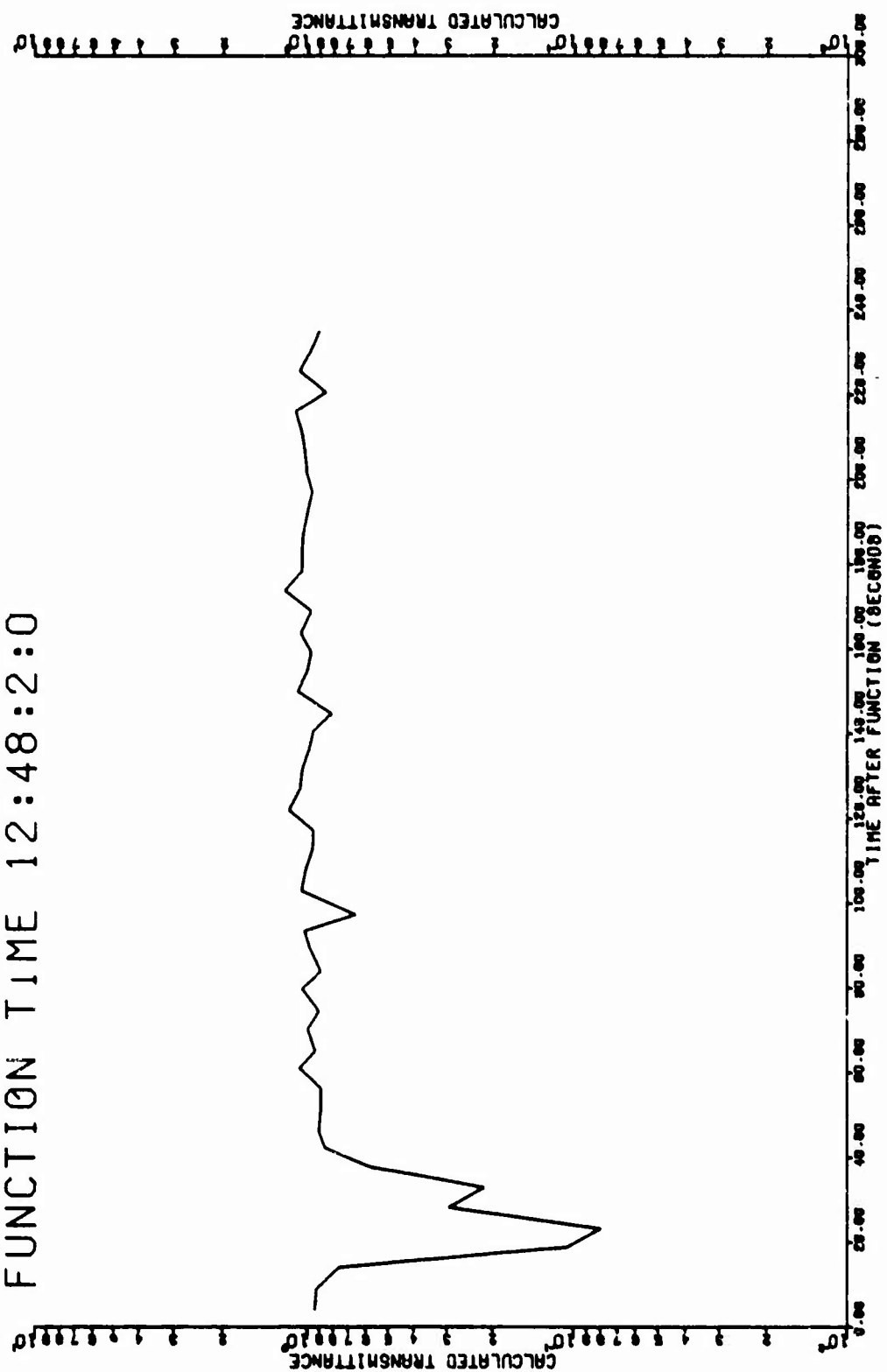
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #5 (DP1-002)
 DATE: 26 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:18:2:0



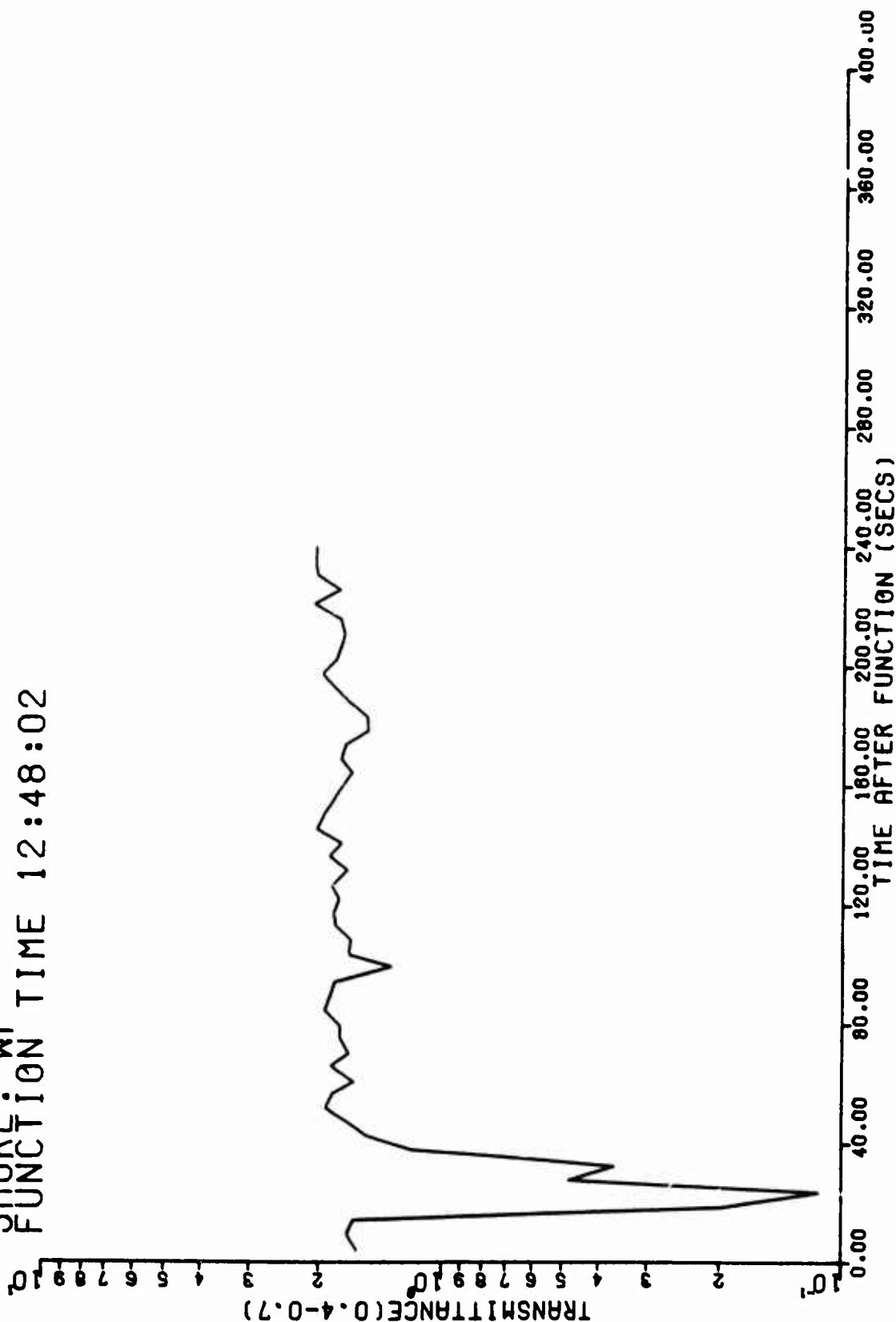
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #5 (DP1-002)
 DATE: 26 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:48:2:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 3

RIAL 5 (DP-1002)
DATE: 26 SEP 1977
SMOKE: WP
FUNCTION TIME 12:48:02



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW Q

APPENDIX B-I-5

TRIAL DP1-002-T-6 (WP SMOKE) 5 OCT 1977

SUMMARY OF TEST DATA	B-I-5-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-5-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-5-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-5-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-5-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-5-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-5-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-5-21
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-5-22
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-5-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-5-24
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-5-25
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-5-26
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-5-27
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-5-28

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 ND

FIGURE: PARTICLE SIZE DISTRIBUTION ND

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME ND

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME ND

SUMMARY OF TEST DAY DATA

Trial: 6

Date: 5 Oct 77

Time: 1508 MDT

Wind Direction (Transport) (degrees) (4m)	183
Mean Wind Speed (Transport) (\bar{u} , m/sec)	4.3
Temperature of 2-meters, Trial Time (T , $^{\circ}\text{C}$).....	26.6
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	12.9
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m).....	4.3
Temperature Gradient, 0.5-8m (ΔT , $^{\circ}\text{C}$).....	-3.4
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.15
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	22
Solar Azimuth (deg)	215.1
Solar Altitude (deg)	38.7
Air Density - ρ' (kg m^{-3})	1.011
Solar Radiation (Langleys per minute)	1.024
Barometric Pressure (millibars)	866.8
Visibility (km)	137
Reflectivity, OD Target	0.11
Haze (footlamberts)	58
Brightness, Background (footlamberts)	1260
Brightness, White Target (footlamberts)	1408
Brightness, OD Target (footlamberts)	210
Percent Opaque Cloud Cover	4

Munitions/Submunitions Used (WP, 105mm)	3
Number of Munitions/Submunitions Functioned	3
Particle Size Range (micron)	
(0.3 - 0.4)	ND
(0.4 - 0.6)	ND
(0.6 - 0.8)	ND
(0.8 - 1.0)	ND
(1.0 - 1.5)	ND
(1.5 - 3.0)	ND
Log ₁₀ NMD	ND
Log ₁₀ NMD	ND
NMD	ND
MMD	ND

Initial Cloud Dimensions (Meters)

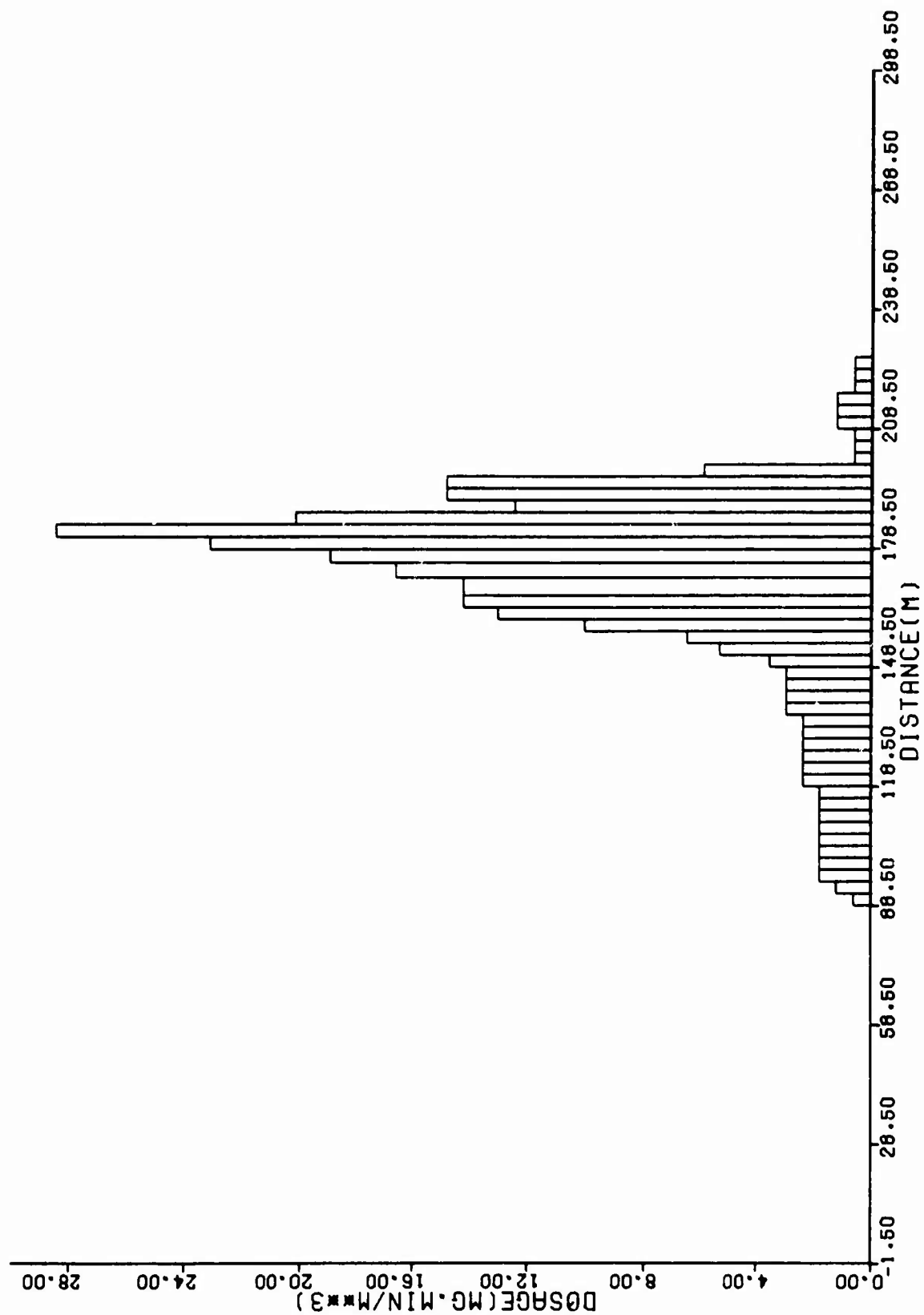
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1508:00	17	18	6
1508:10	59	58	12
1508:20	85	74	13
1508:30	91	89	51
1508:40	85	95	35
1508:50	Cloud traveled out of view of the cameras		

SKY BRIGHTNESS

Light Meter Readings

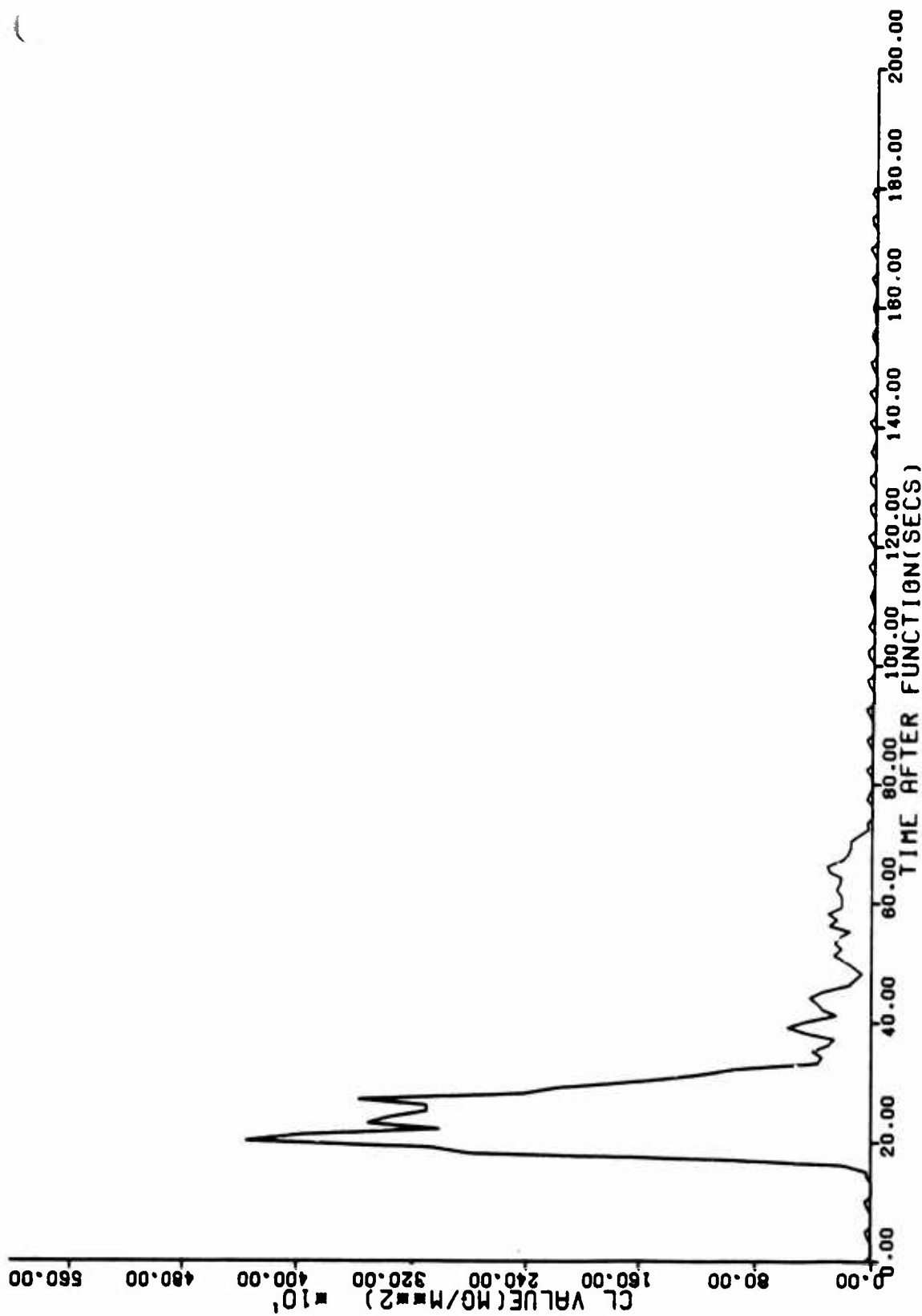
<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	428
5	976
10	976
15	1084
20	1084
25	1084
30	976
35	976
40	976
45	976

Viewing azimuth 240° except 255° at 0 degrees elevation



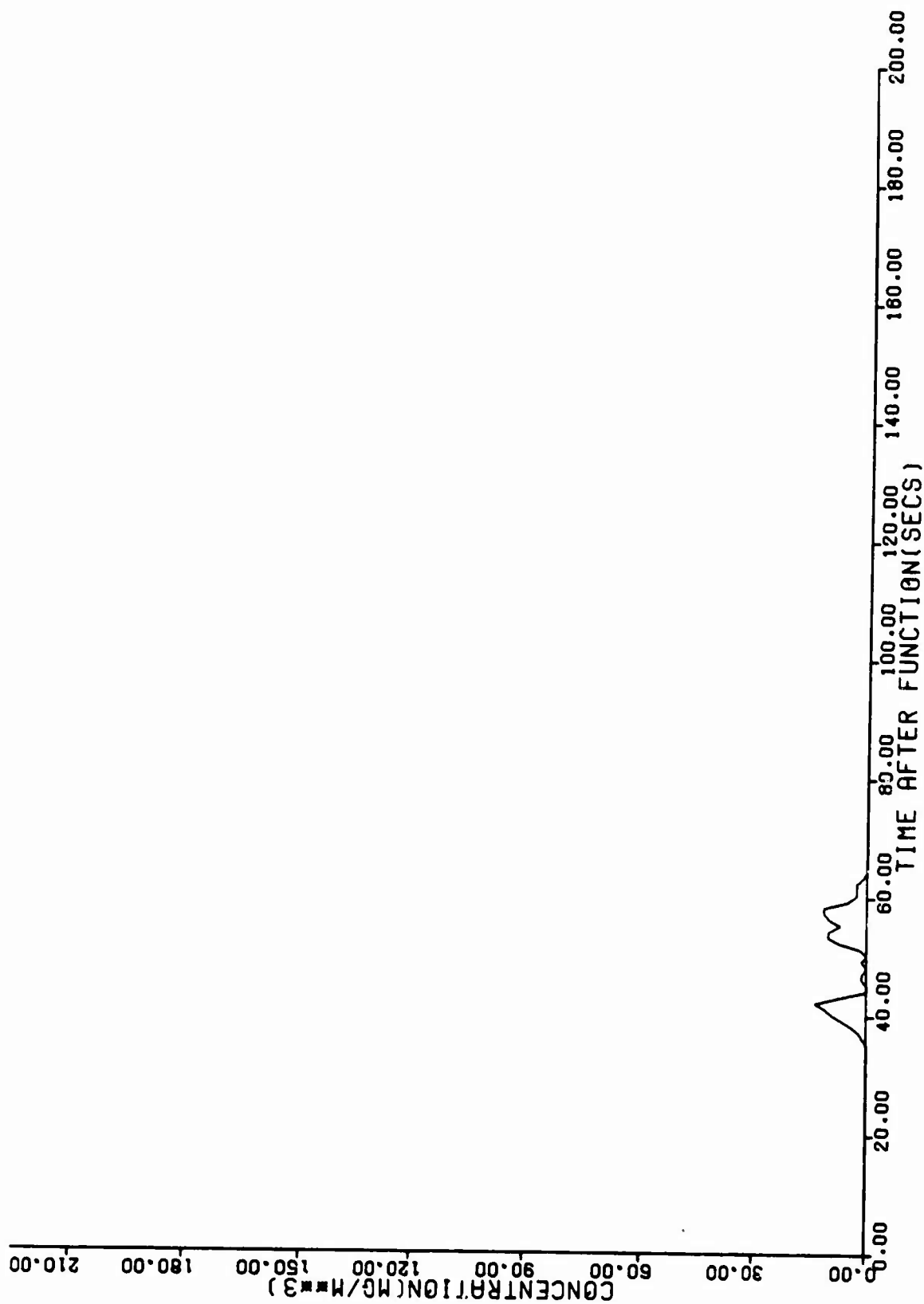
B-I-5-6

.RIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

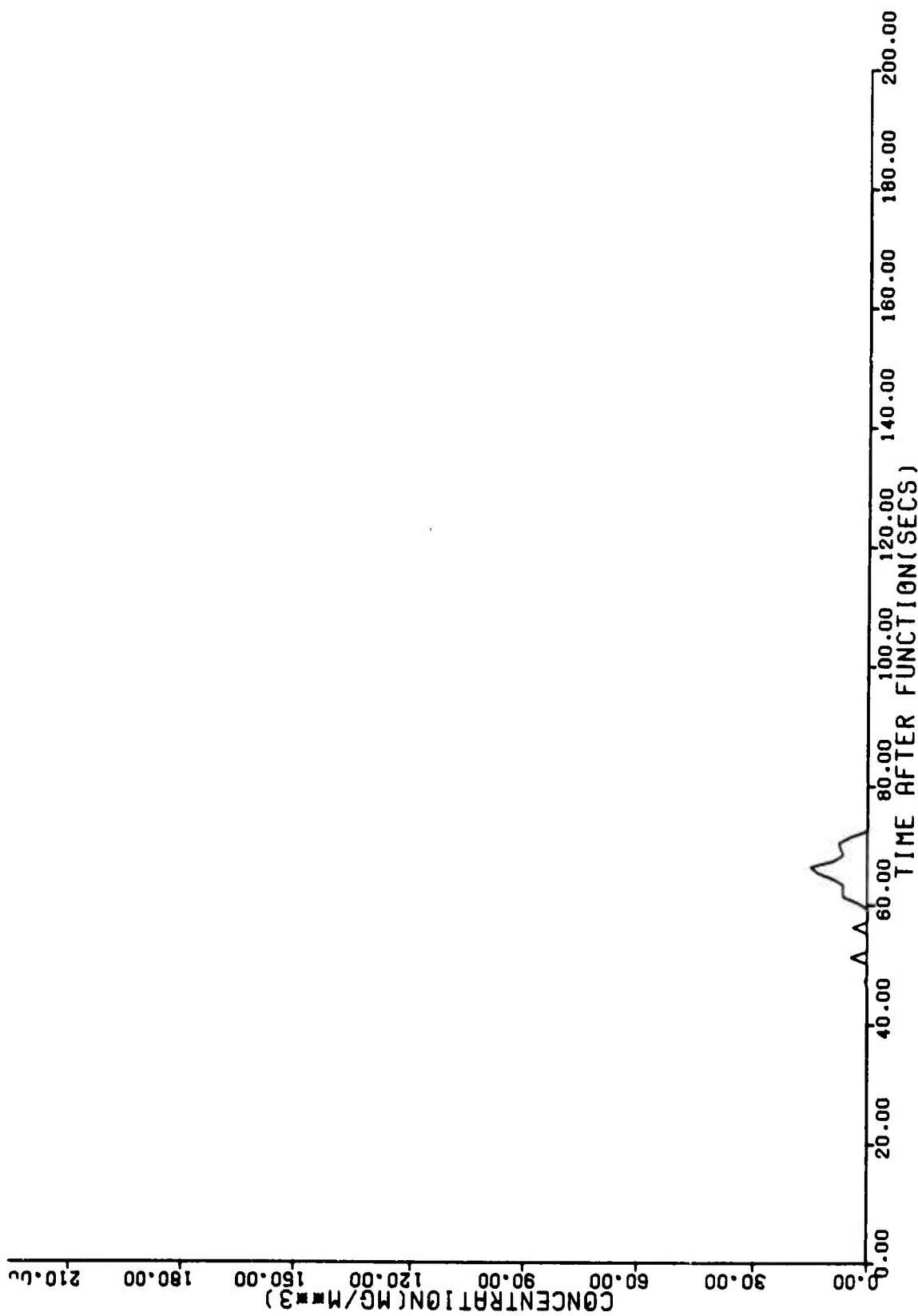


TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS

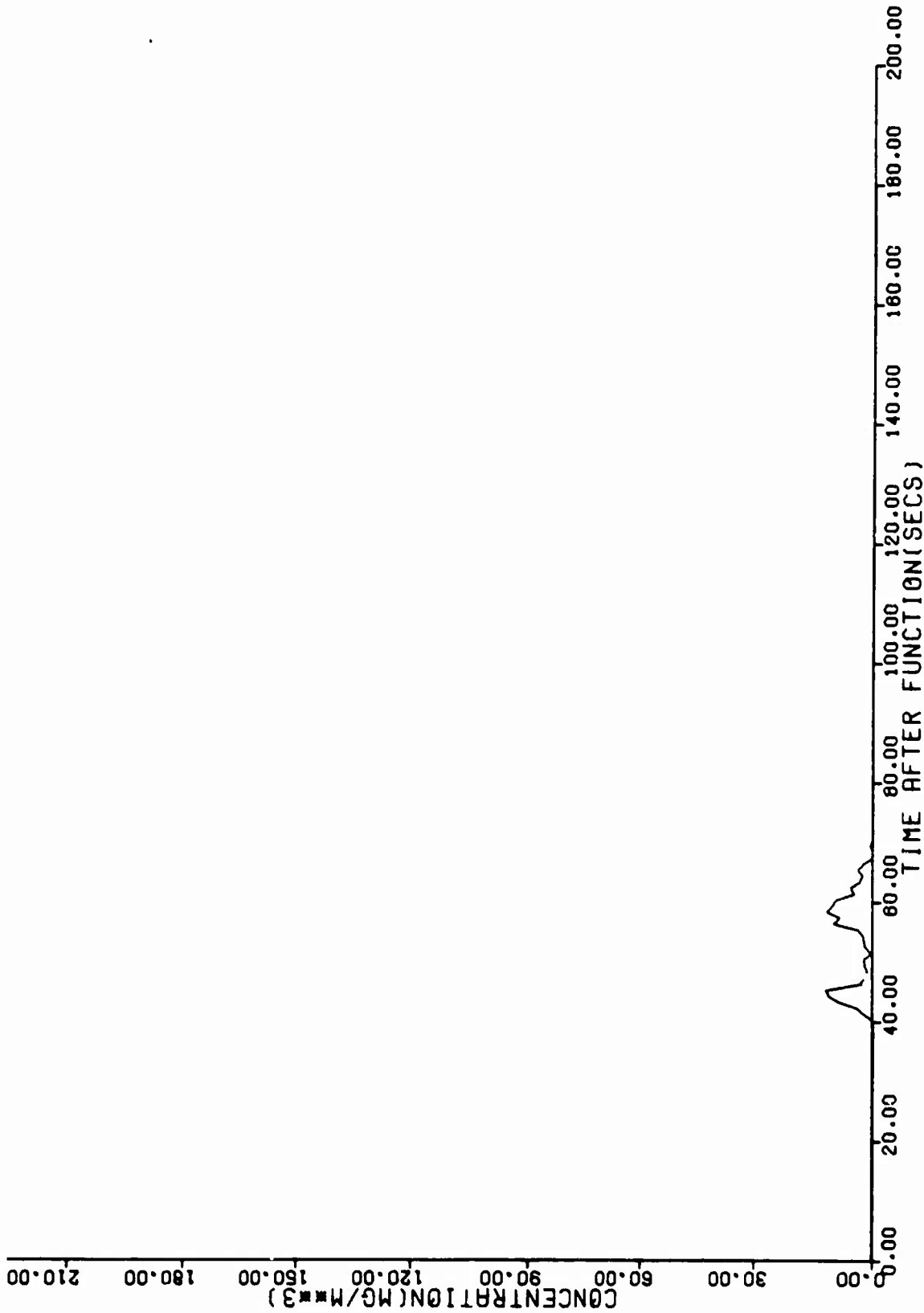


TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE



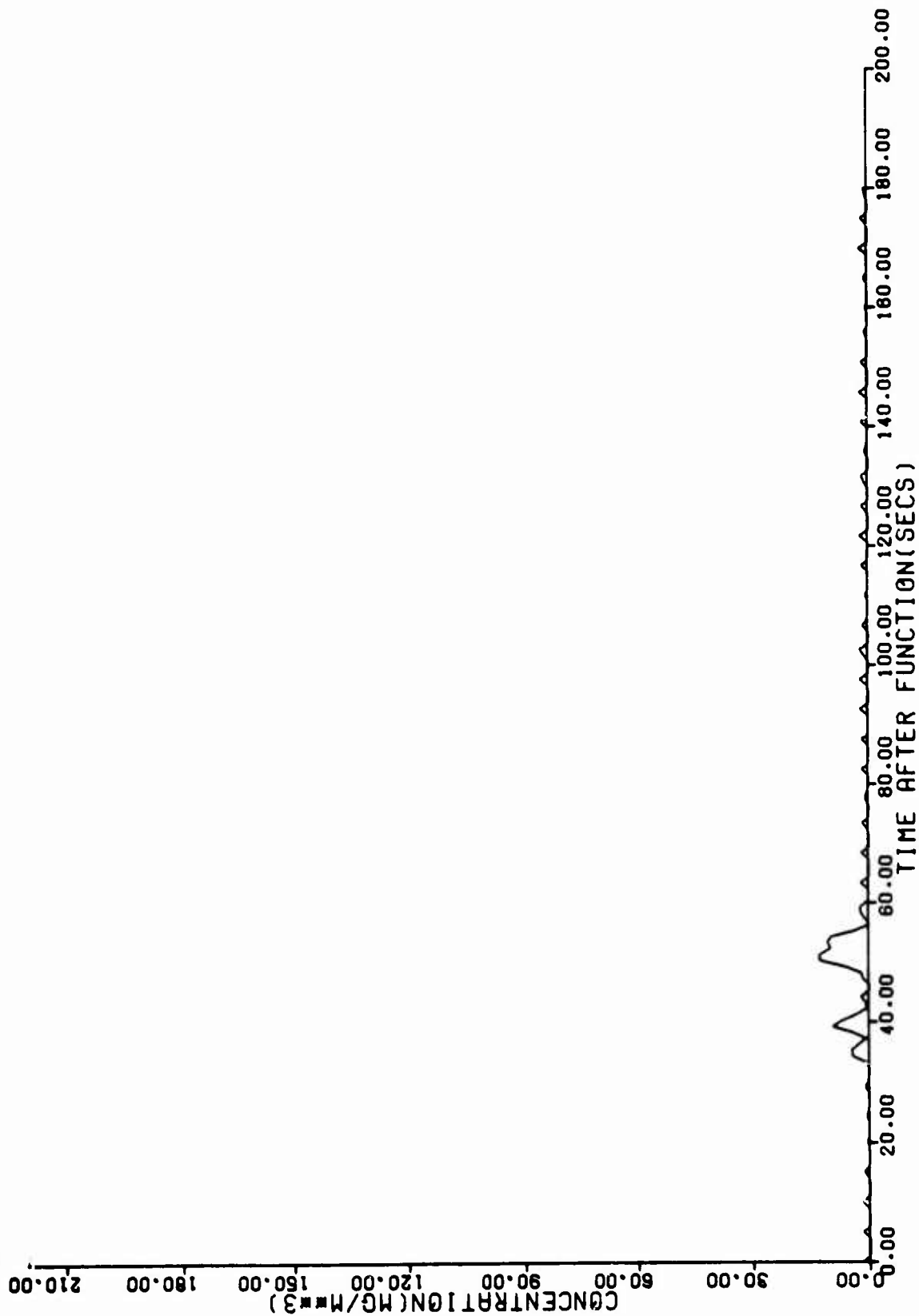
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



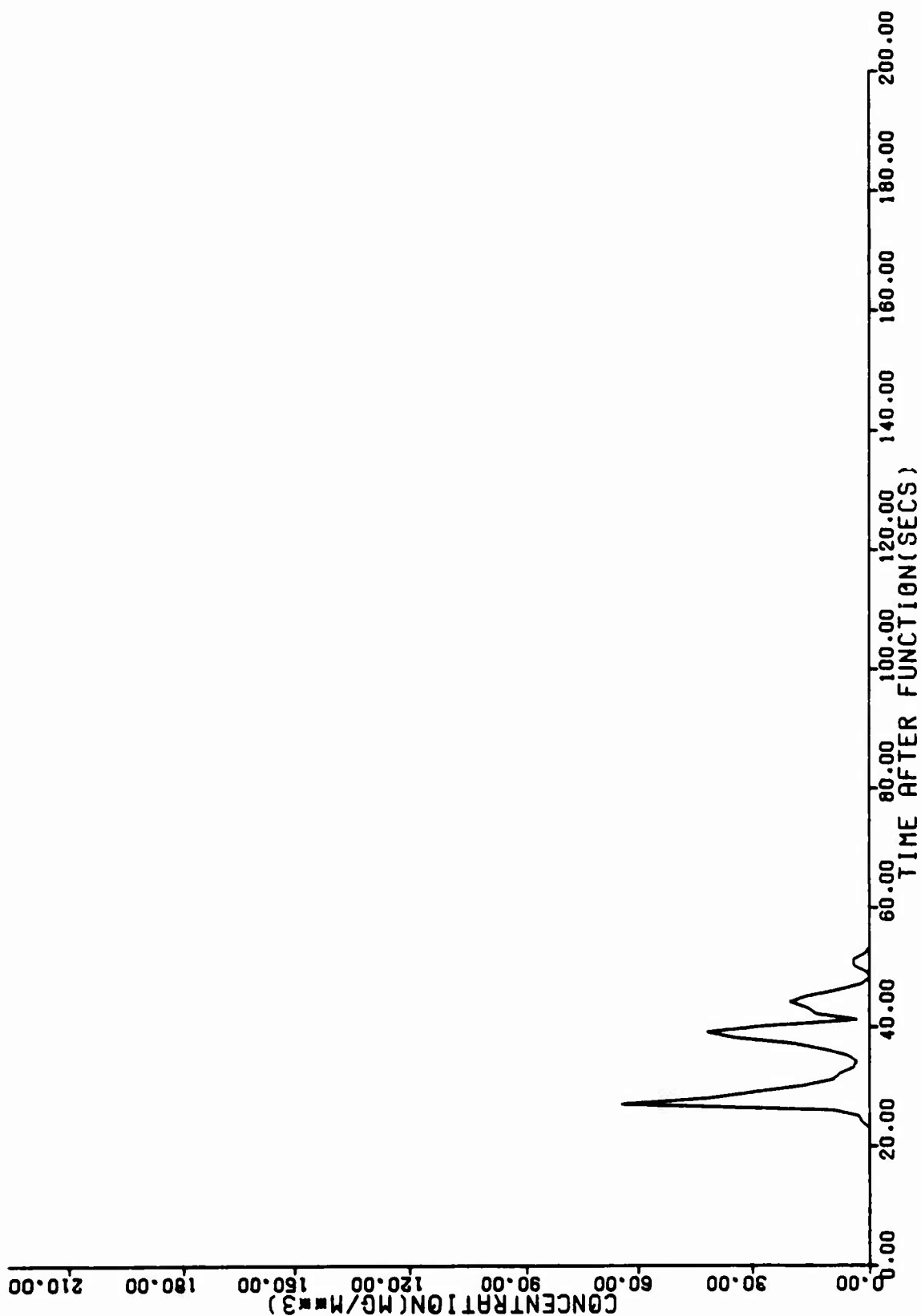
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



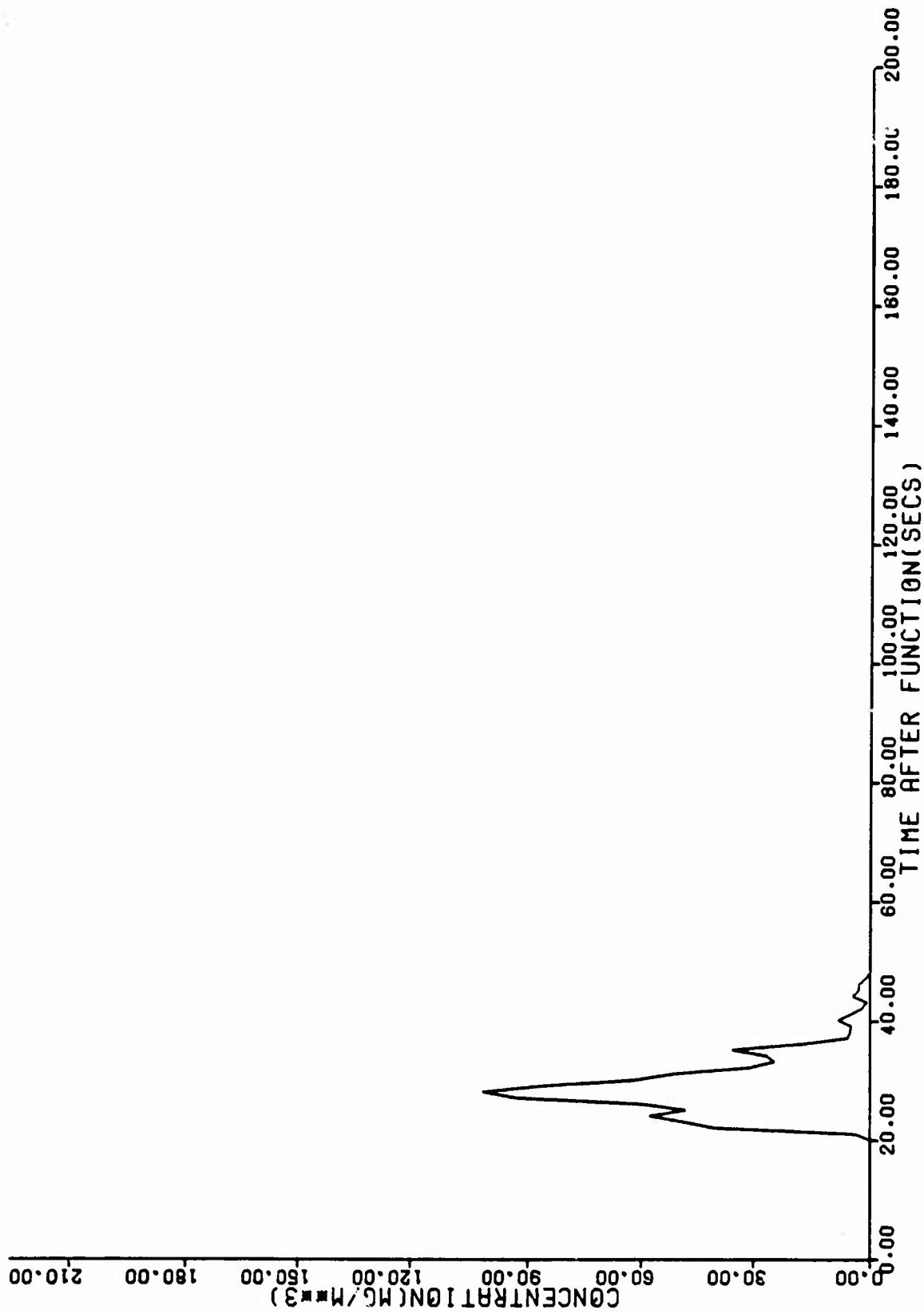
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



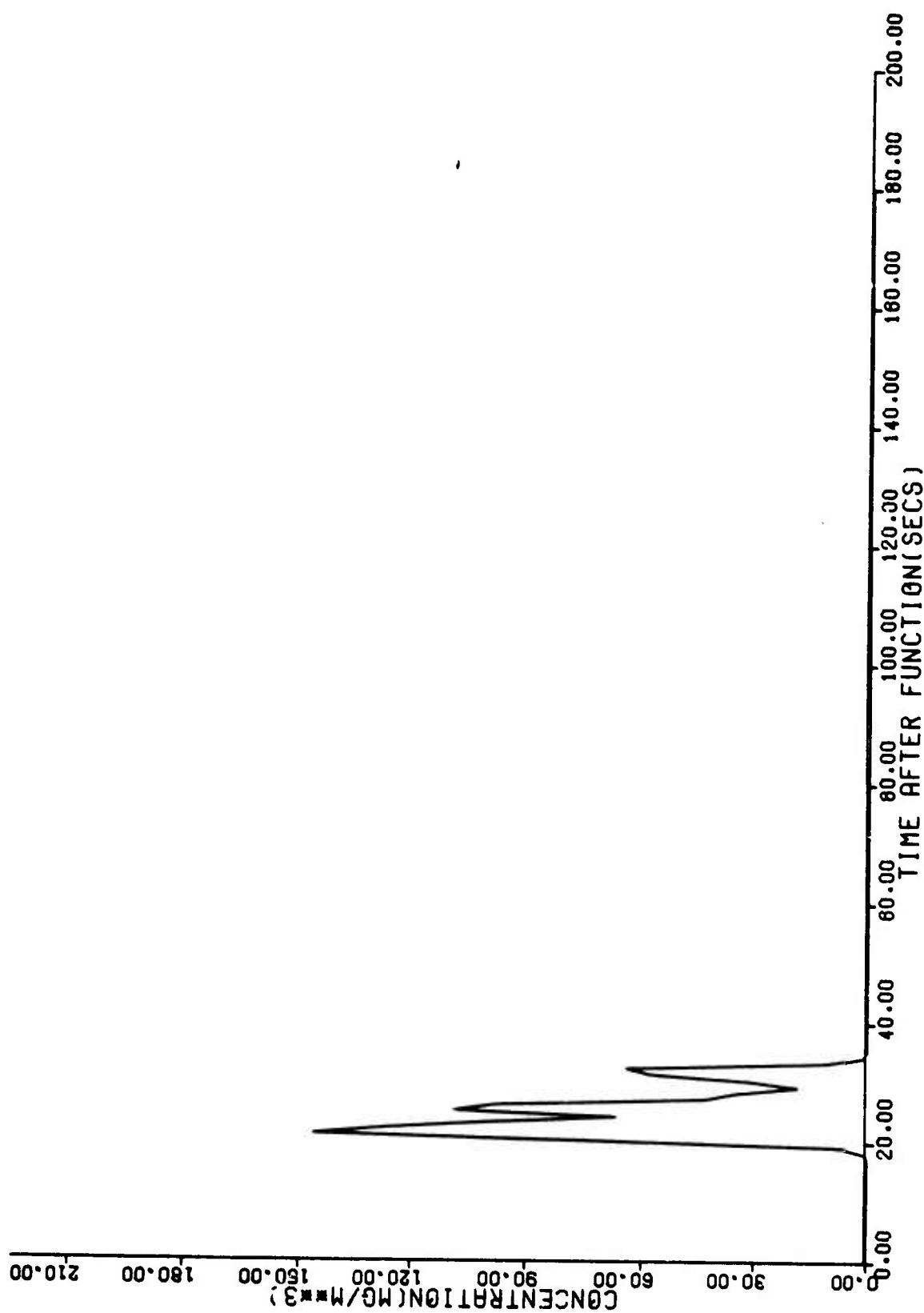
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



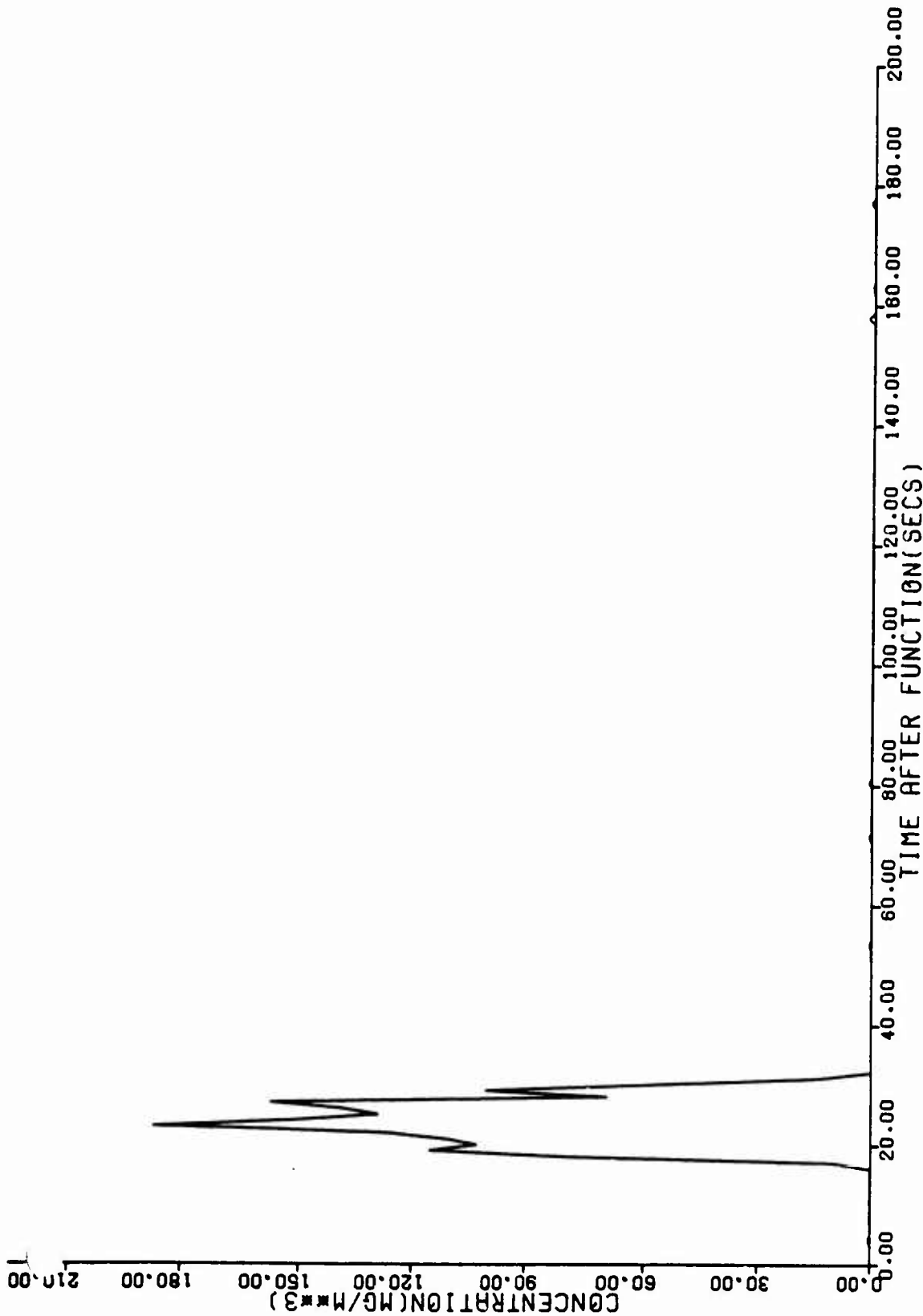
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



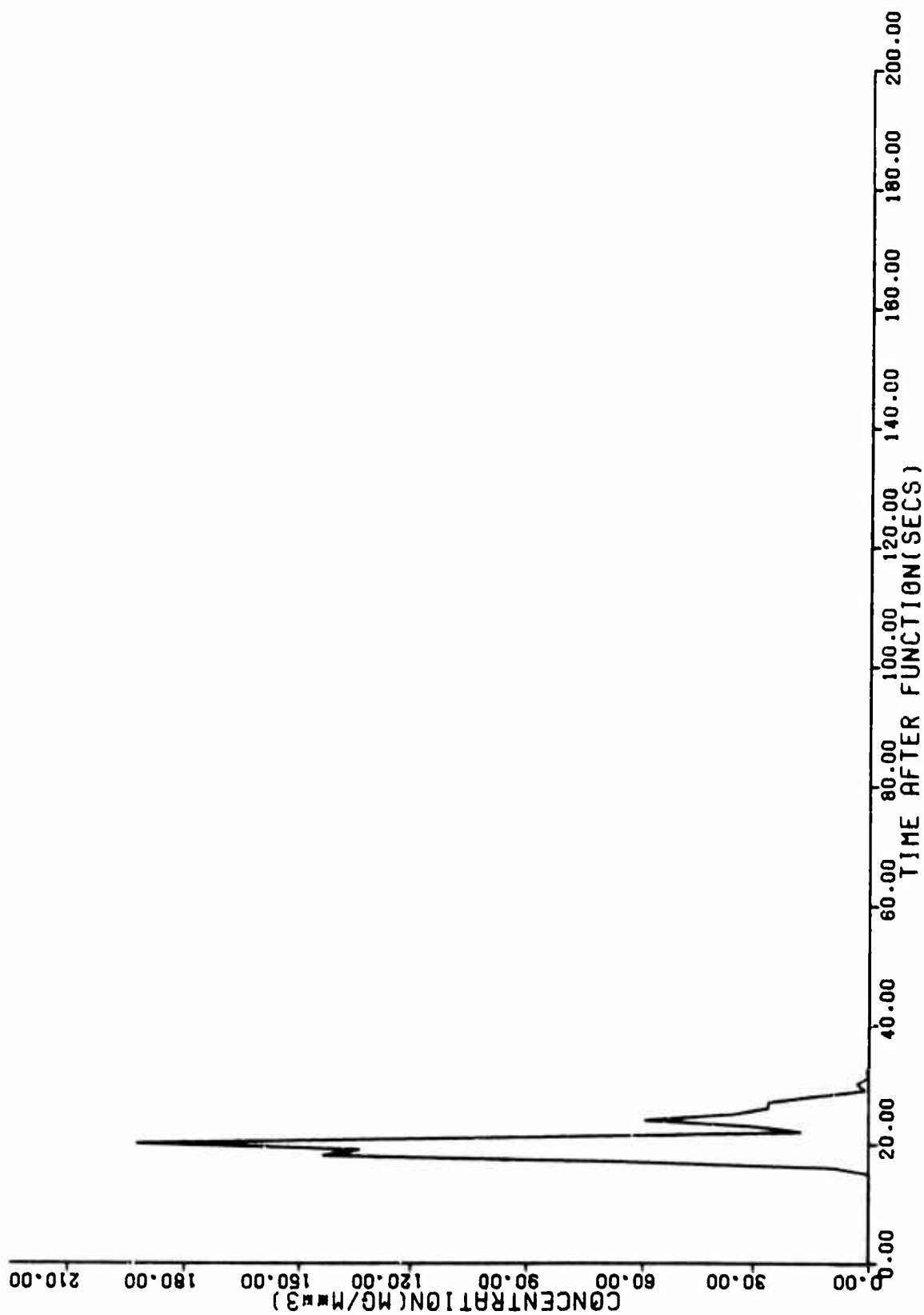
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00



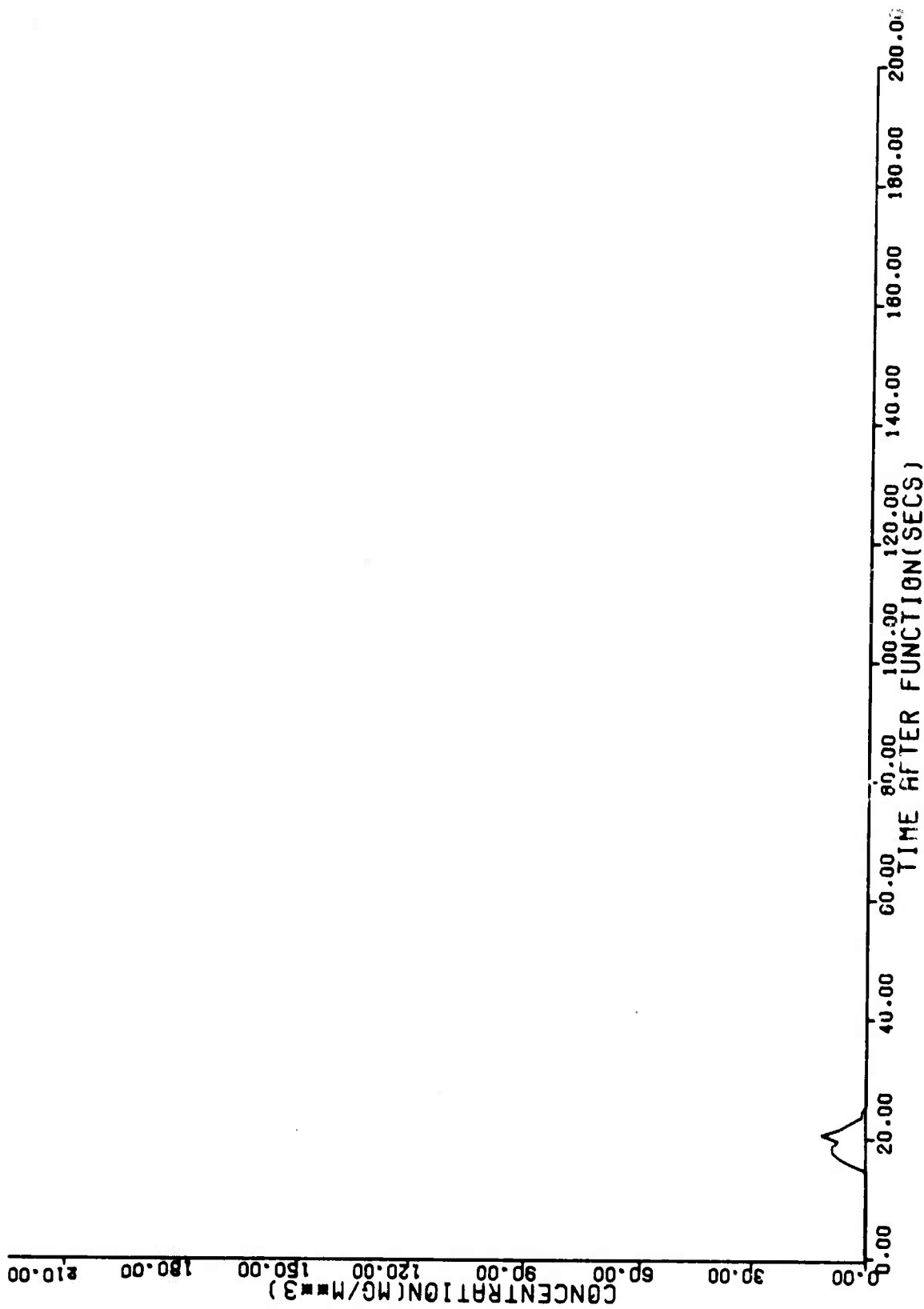
TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00



TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

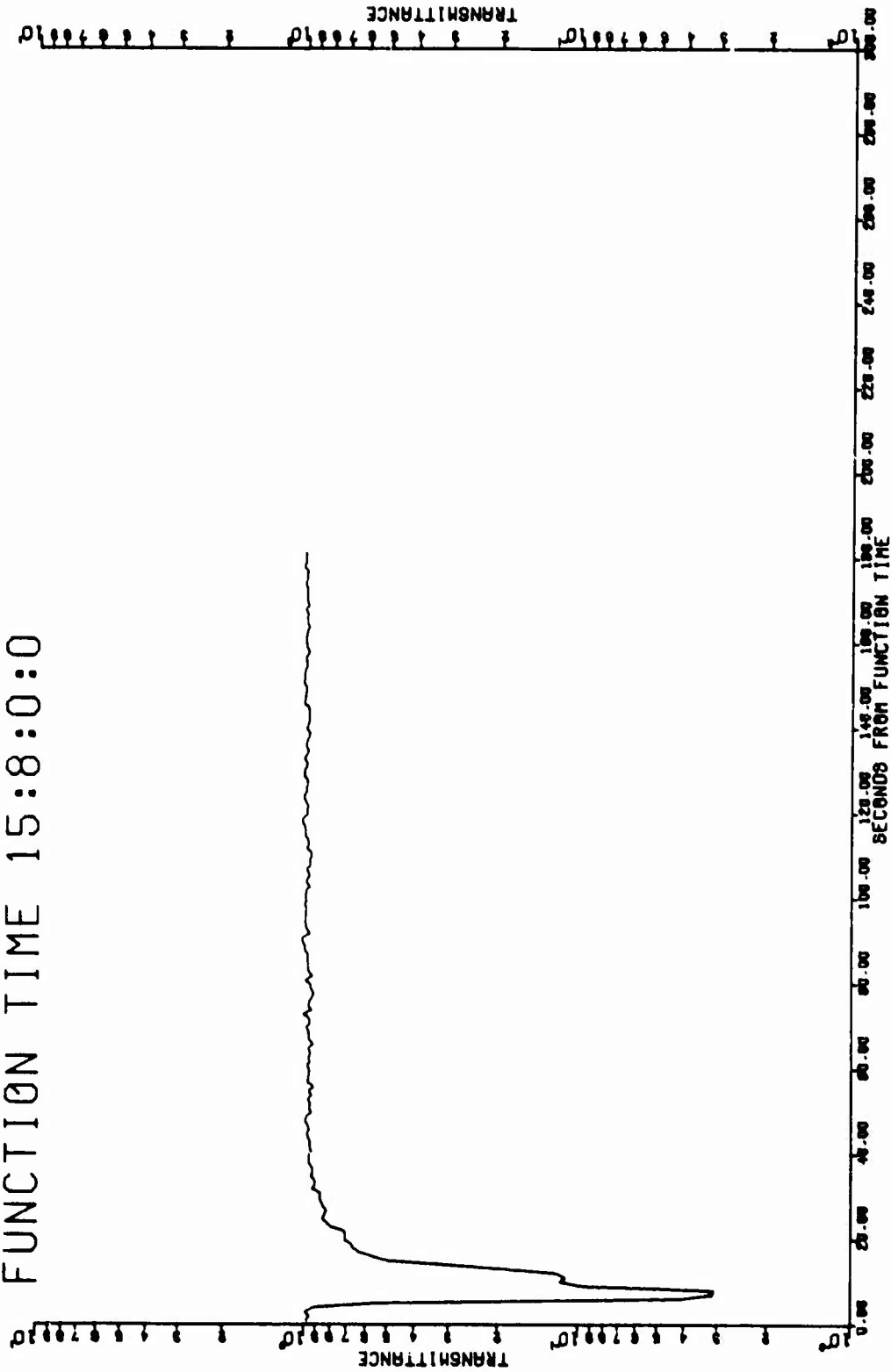
EROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 6 (DP-1002), 5 OCT 1977, 15:08:00, WP SMOKE

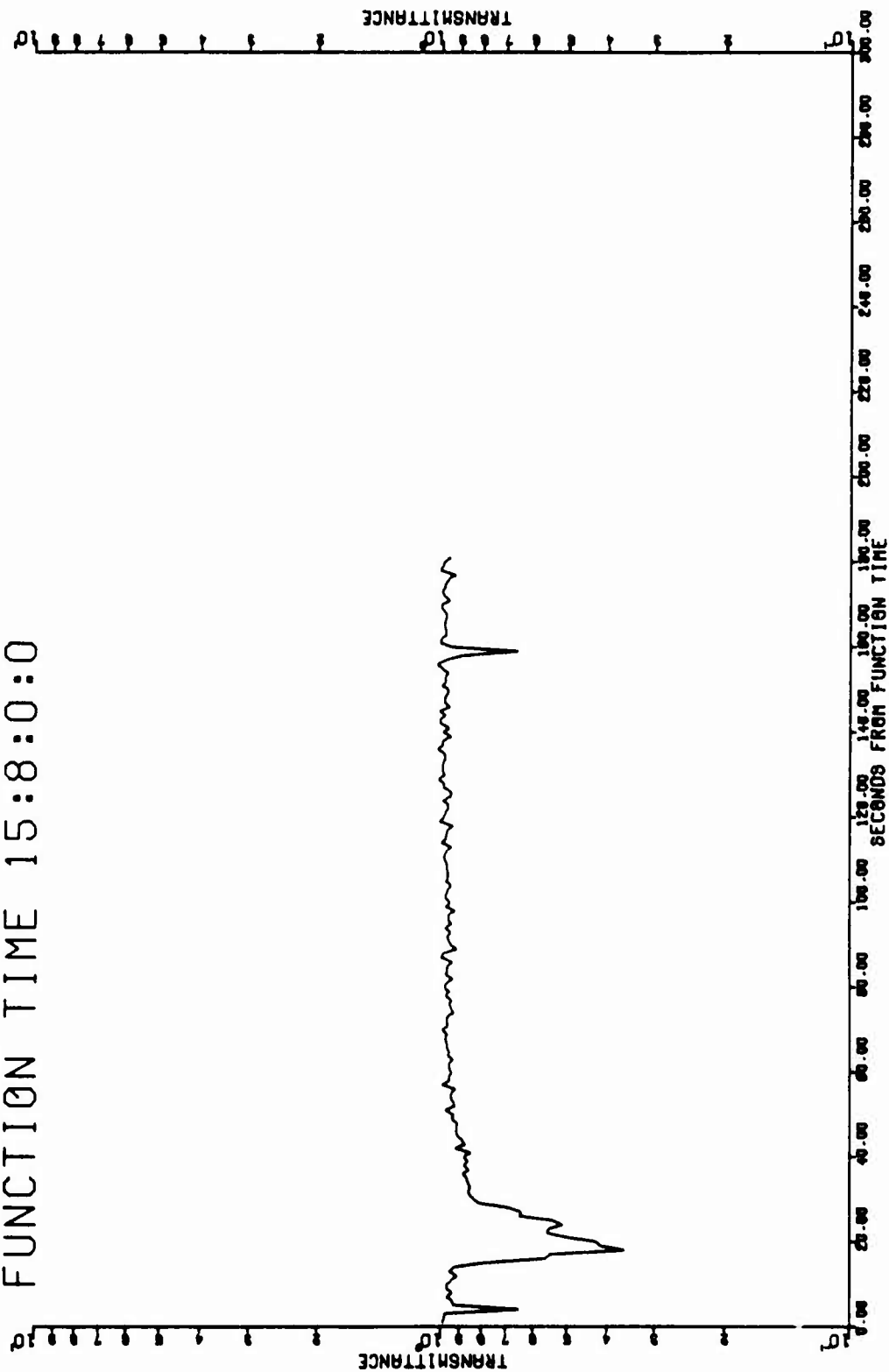
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00

TRIAL #6 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:8:0:0



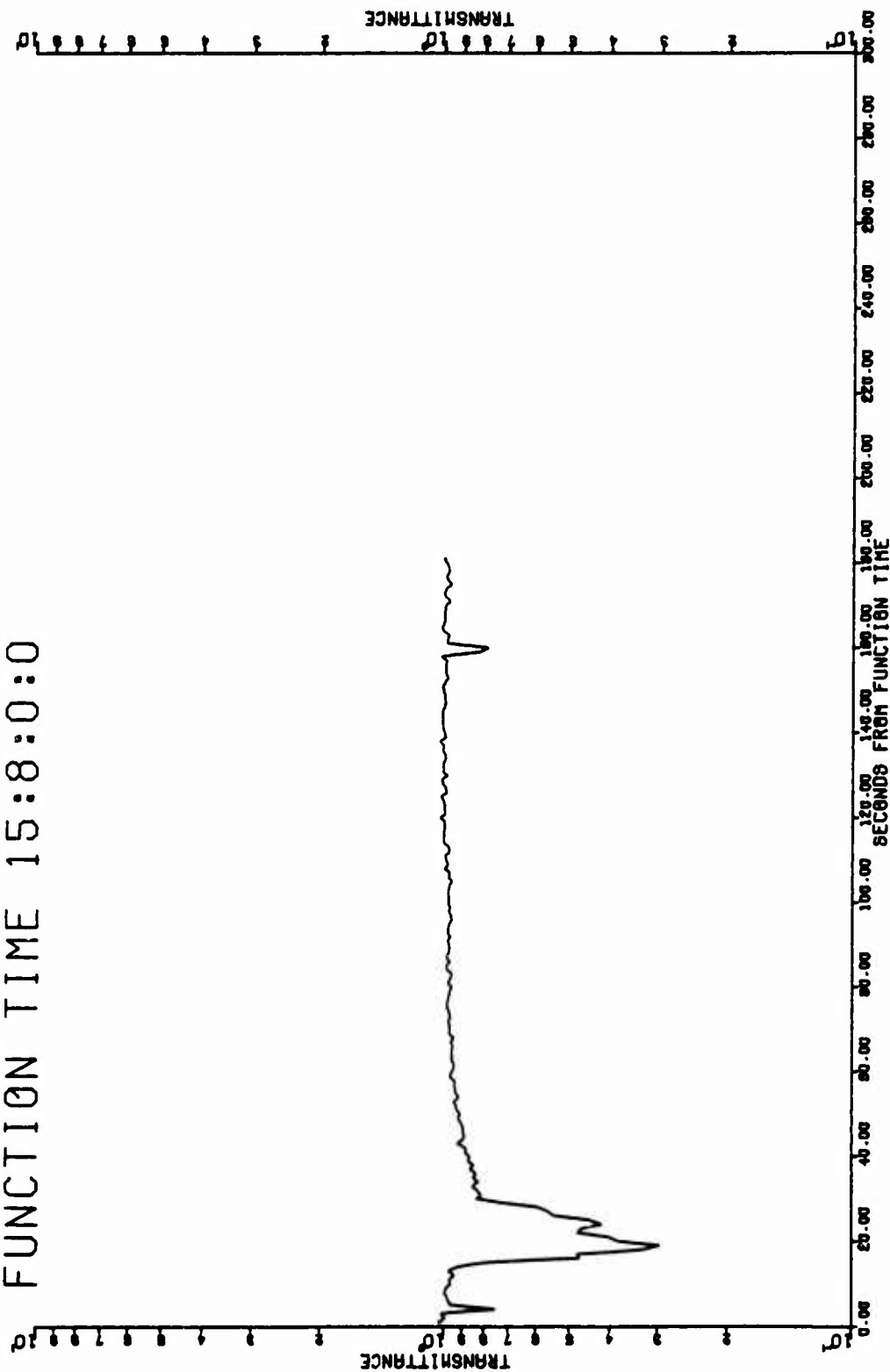
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #6 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:8:0:0



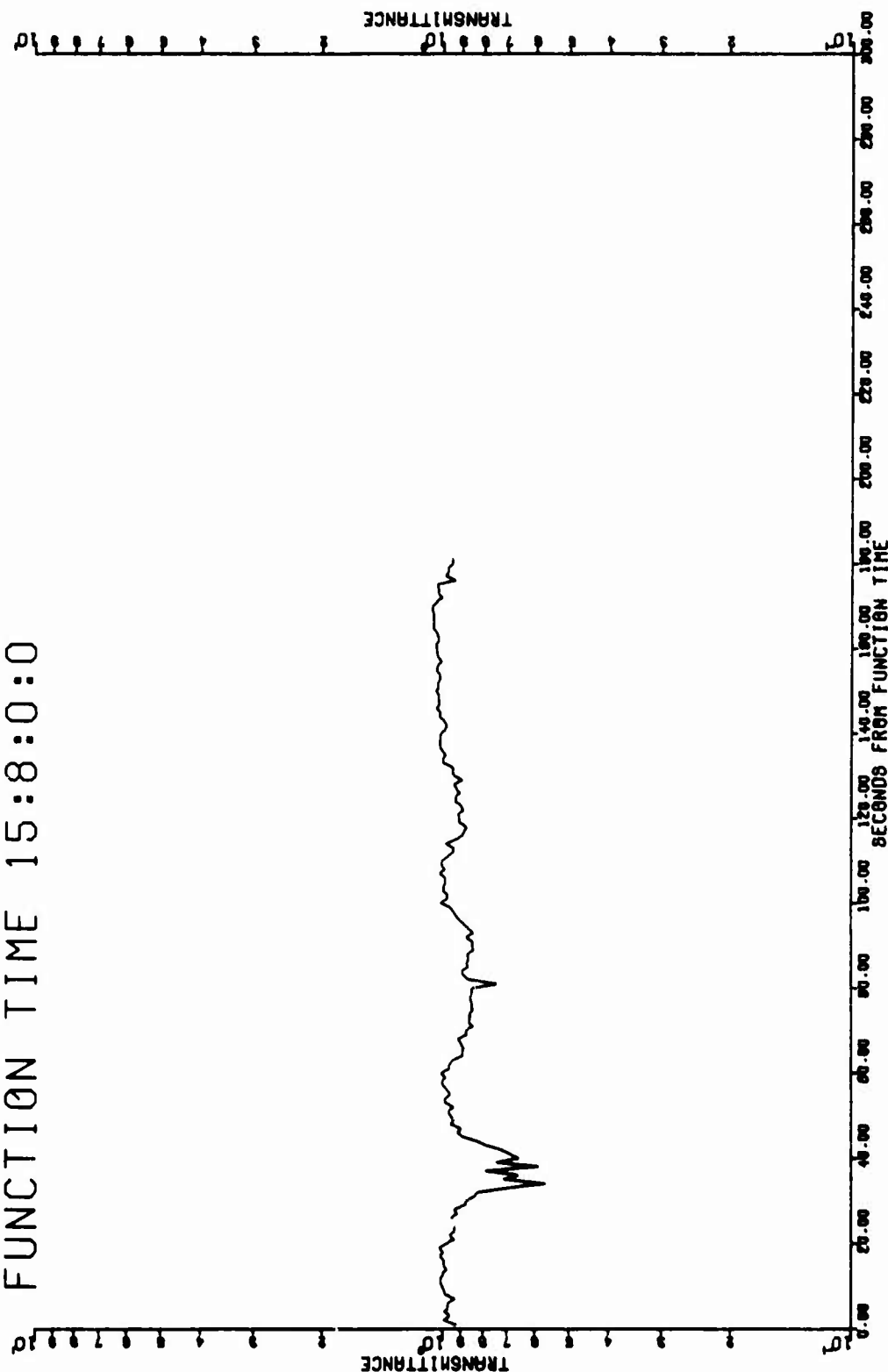
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #6 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:8:0:0



TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #6 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:8:0:0



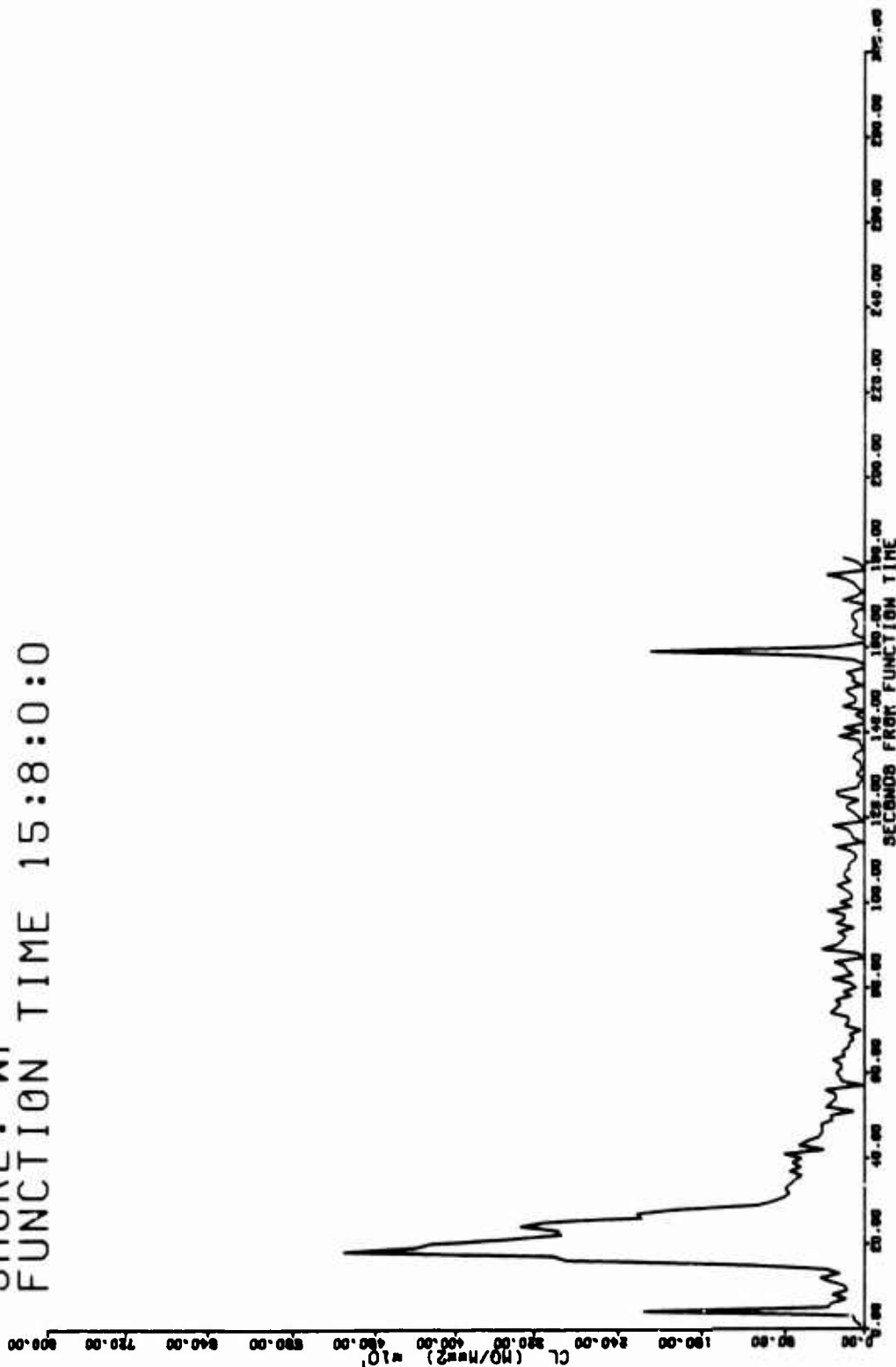
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #6 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 15:8:0:0



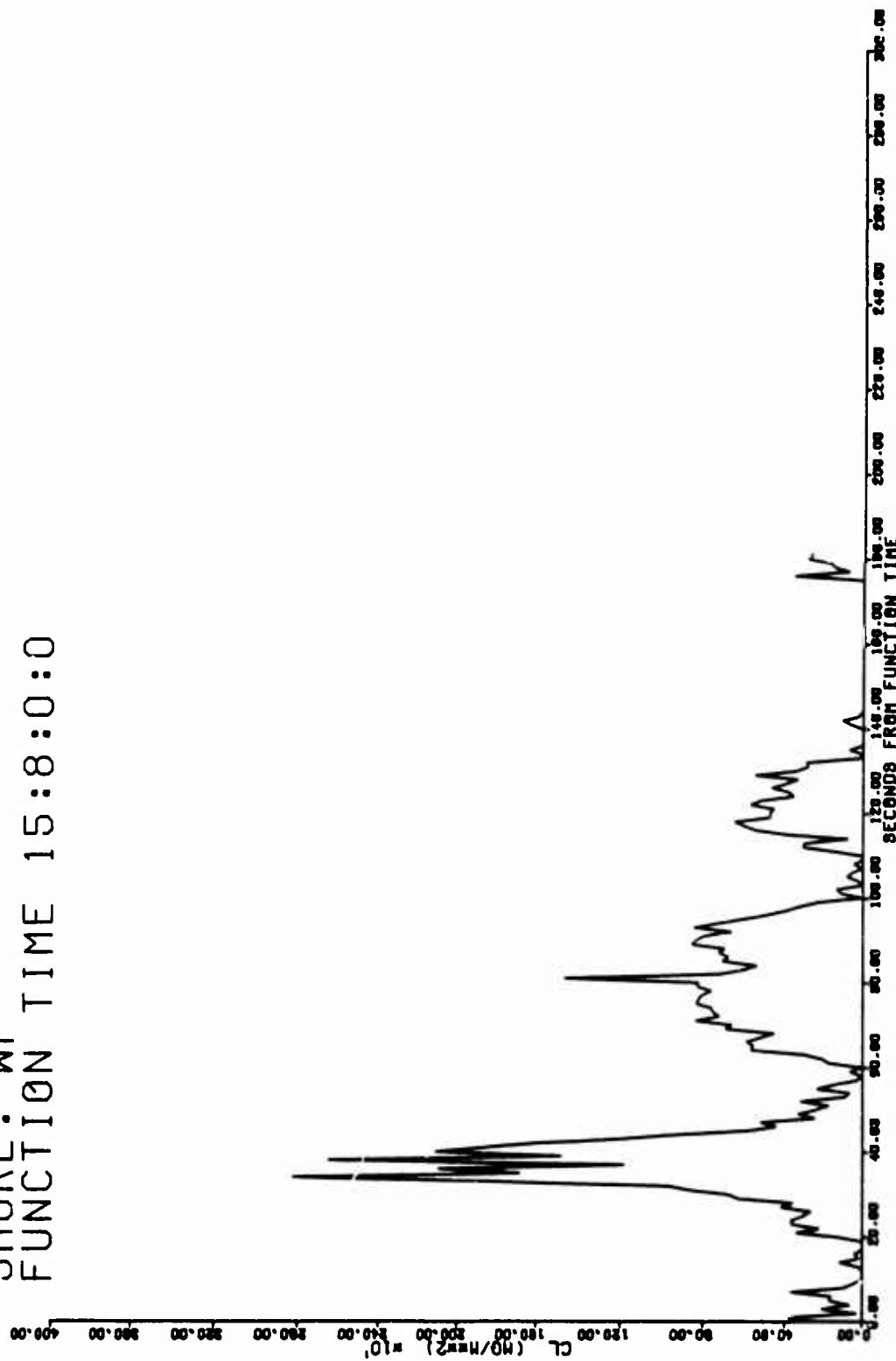
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #6 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 15:8:0:0



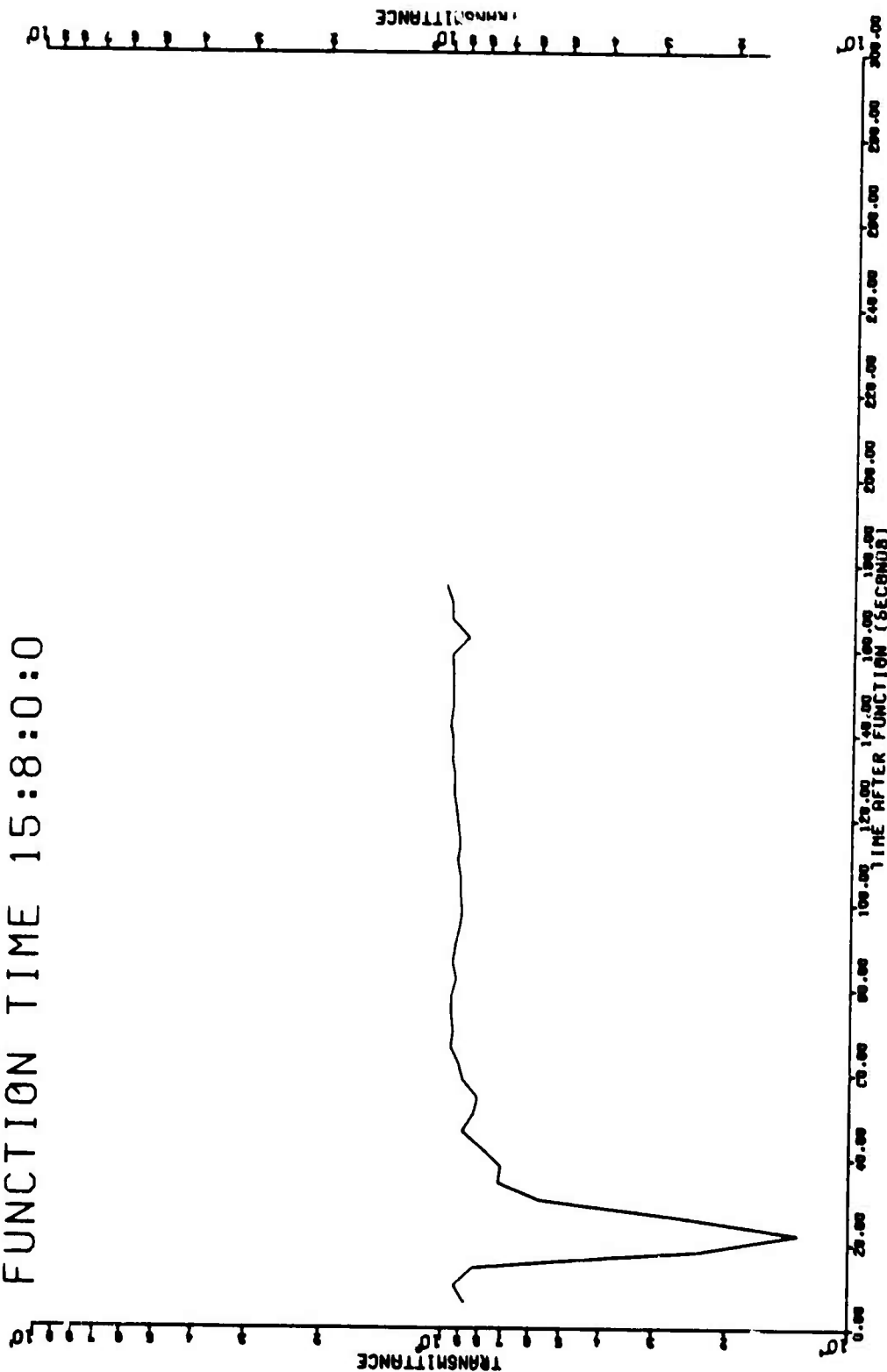
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #6 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 15:8:0:0



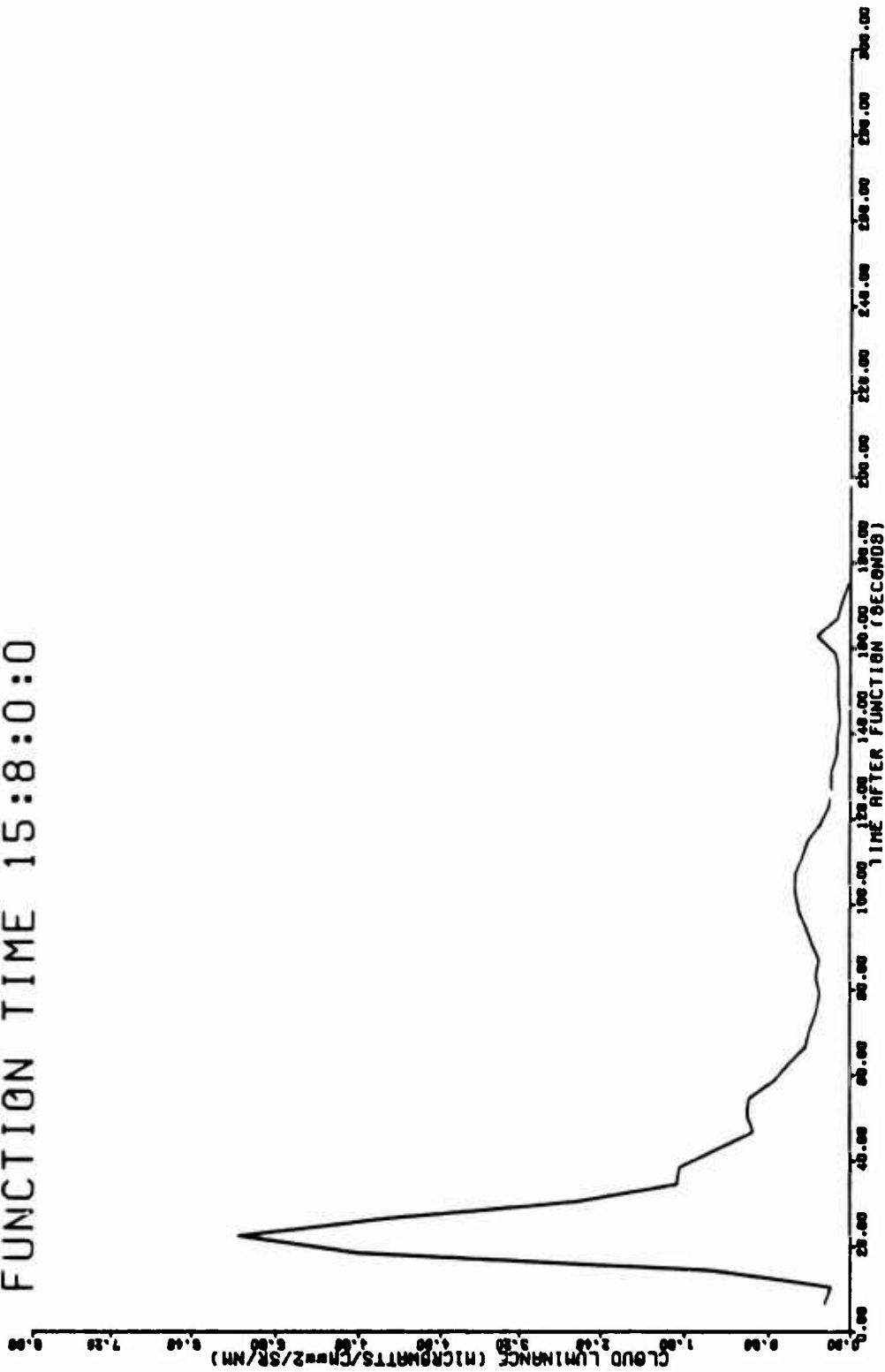
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #6 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 15:8:0:0



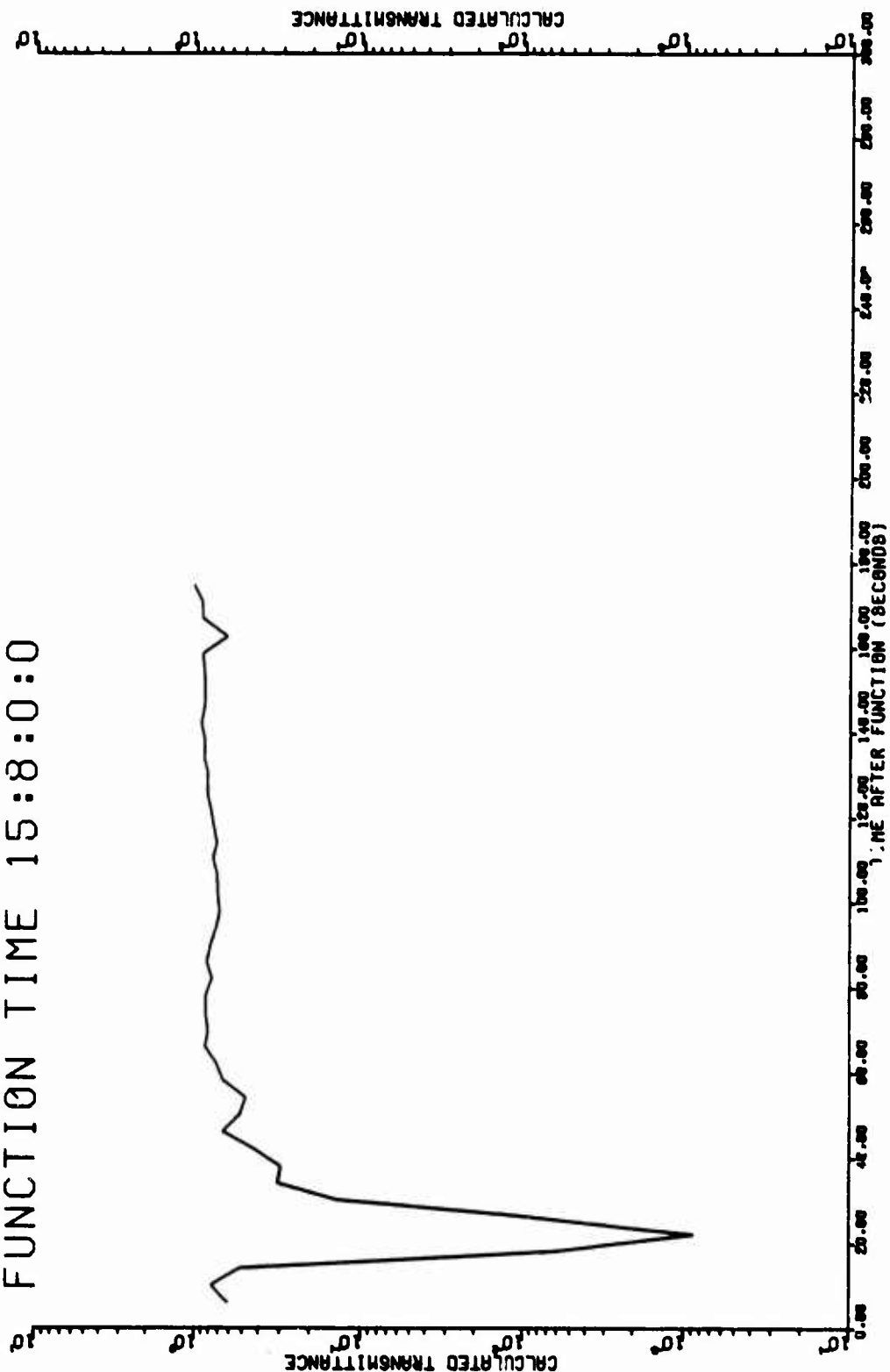
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #6 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 15:8:0:0



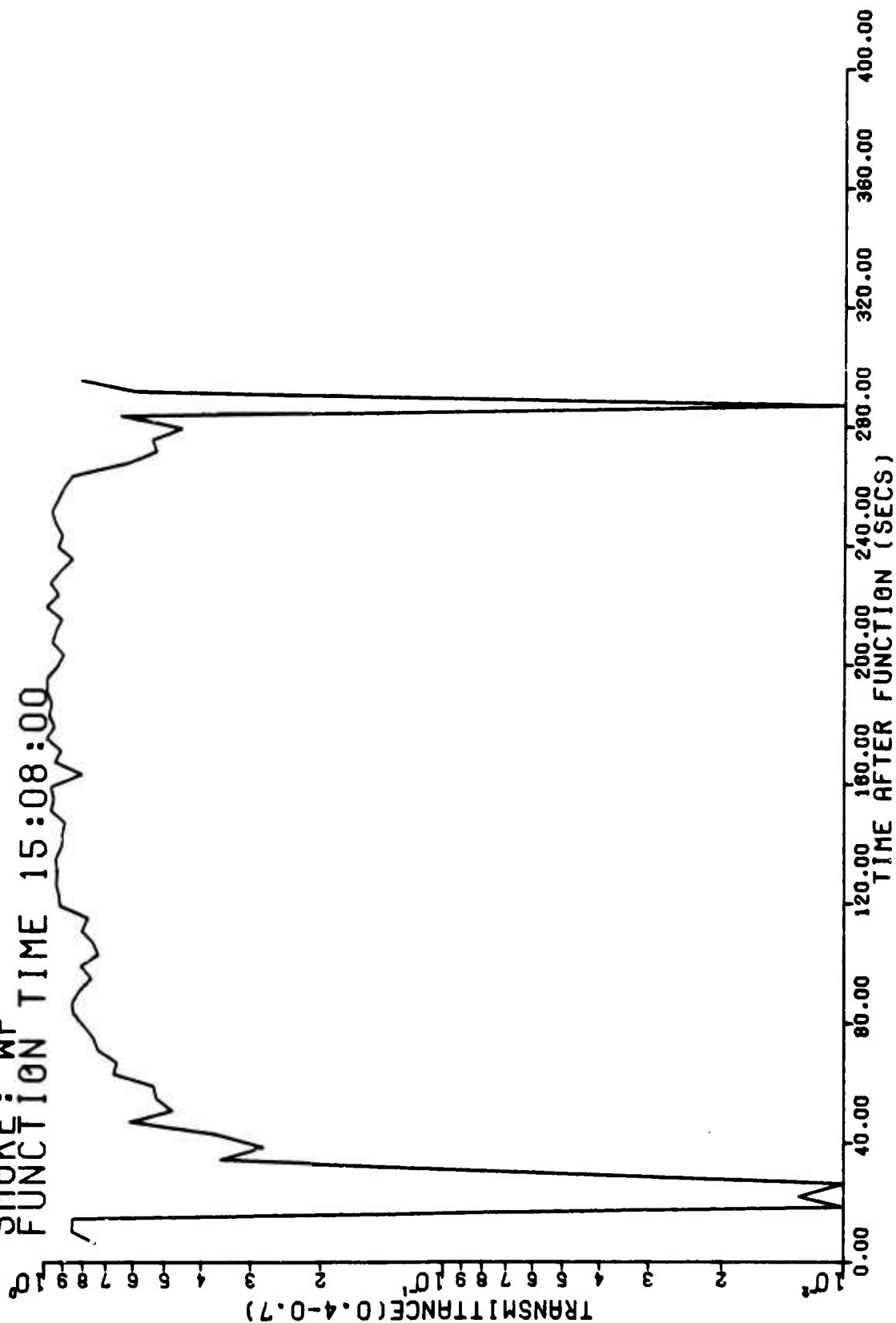
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #6 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:8:0:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 6 (DP-1002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 15:08:00



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 9

APPENDIX B-I-16

TRIAL DP1-002-T-7 (HC SMOKE) 27 OCT 1977

SUMMARY OF TEST DATA	B-I-6-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-6-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-6-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-6-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-6-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-6-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-6-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-6-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-6-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-6-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-6-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-6-20
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-6-21
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-6-22
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-6-23

- FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 B-I-6-24
- FIGURE: PARTICLE SIZE DISTRIBUTION B-I-6-25
- FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME B-I-6-26
- FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME B-I-6-27

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #7

Date: 07 Oct 77

Time: 1238:00 MDT

Wind Direction (Transport) (degrees) (4m)	353
Mean Wind Speed (Transport) (\bar{u} , m/sec)	4.4
Temperature at 2-meters, Trial Time (T, °C)	14.3
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	15.7
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	5.2
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.4
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.15
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	41
Solar Azimuth (deg)	146.6
Solar Altitude (deg)	38.5
Air Density - ρ (kg m ⁻³)	1.062
Solar Radiation (Langleys per minute)	1.144
Barometric Pressure (millibars)	873.6
Visibility (km)	97
Reflectivity, OD Target	0.21
Haze (footlamberts)	38
Brightness, Background (footlamberts)	1580
Brightness, White Target (footlamberts)	1462
Brightness, OD Target	350
Percent Opaque Cloud Cover	1

Munitions/Submunitions Used (WP, 105MM)	6
Number of Munitions/Submunitions Functioned	6
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.42
(0.4 - 0.6) . . . . .	.31
(0.6 - 0.8) . . . . .	.13
(0.8 - 1.0) . . . . .	.07
(1.0 - 1.5) . . . . .	.06
(1.5 - 3.0) . . . . .	.01
Log ₁₀ NMD	-.35286
σ Log ₁₀ NMD . . . . .	.23470
NMD	0.44
MMD	0.59

Initial Cloud Dimensions (Meters) *

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
-------------	---------------	--------------	---------------

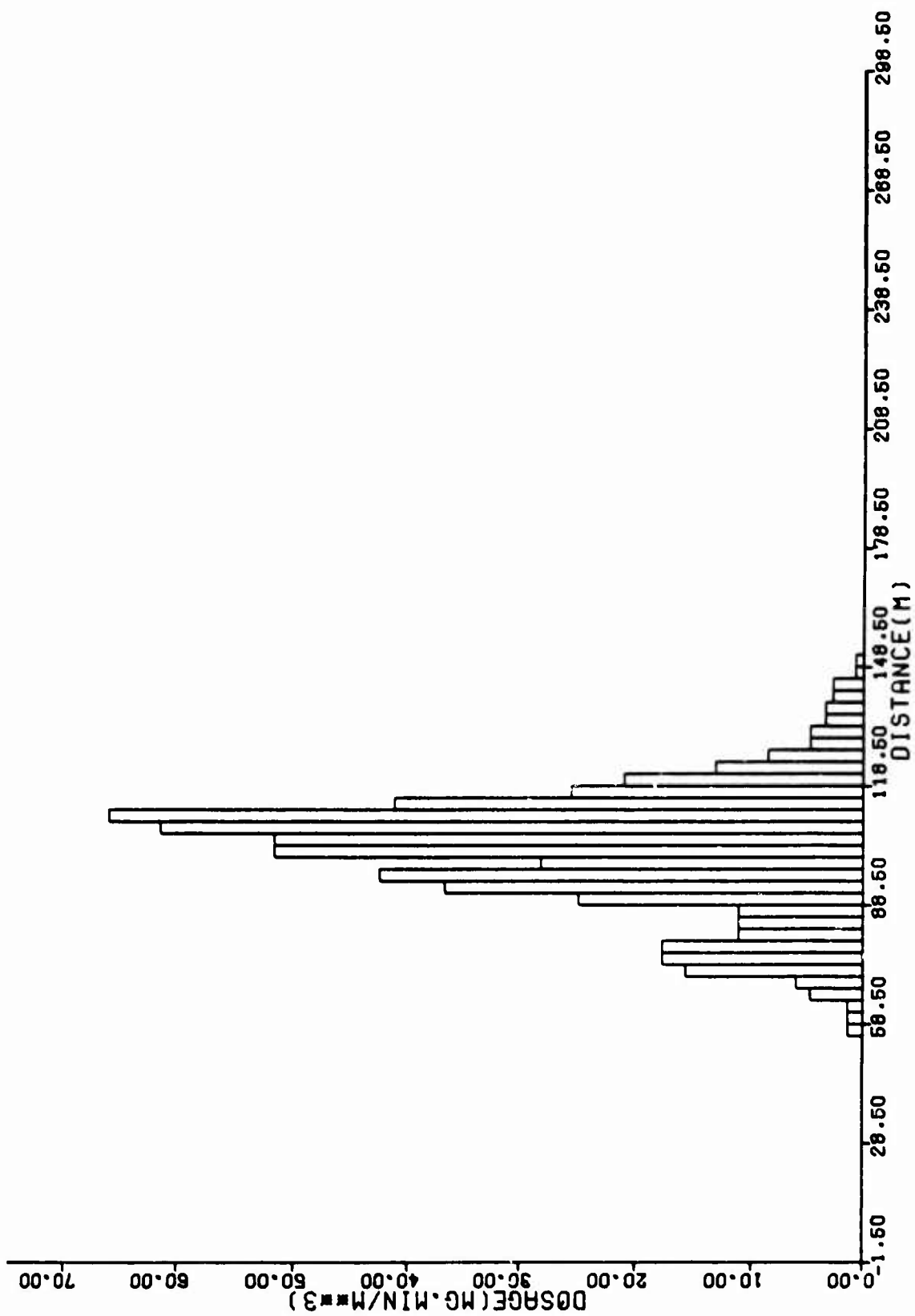
* No camera coverage

SKY BRIGHTNESS

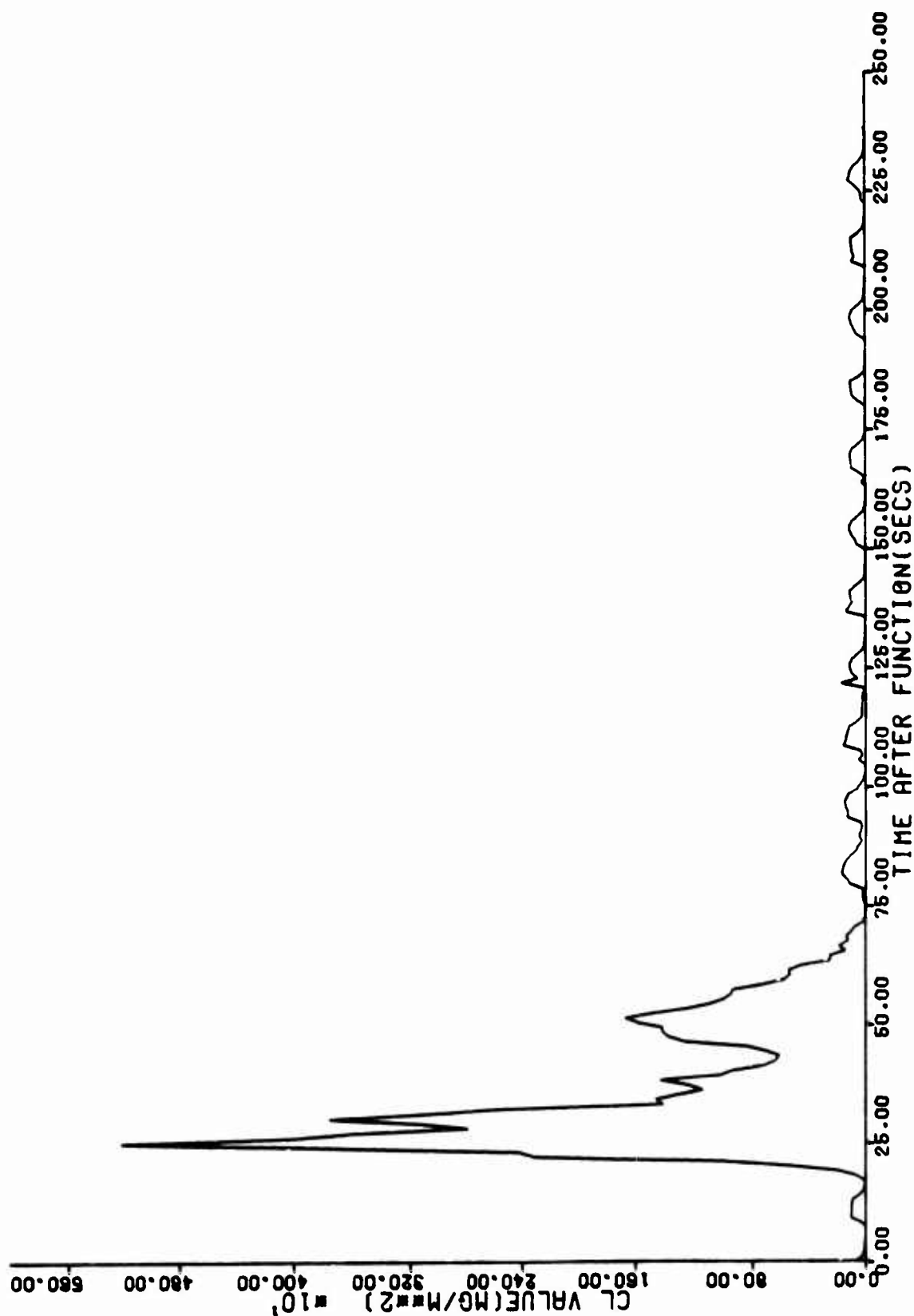
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	1084
5	2212
10	2212
15	2212
20	1300
25	1300
30	1300
35	1140
40	1140
45	1140

Viewing azimuth 240° except 255° at 0 degrees elevation

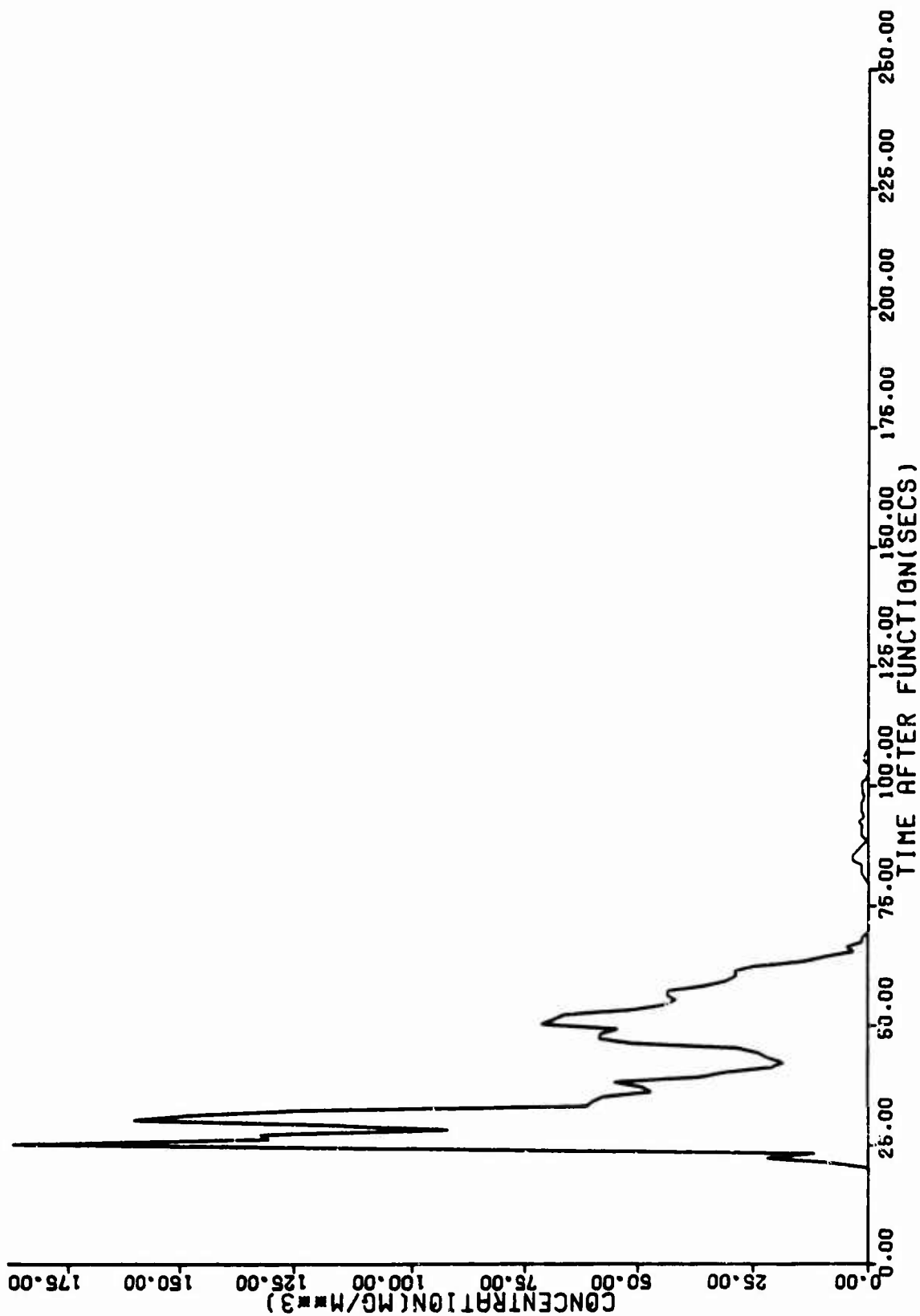


TRIAL 7 (DP-1002). 7 OCT 1977, 12:38:00. WP SMOKE



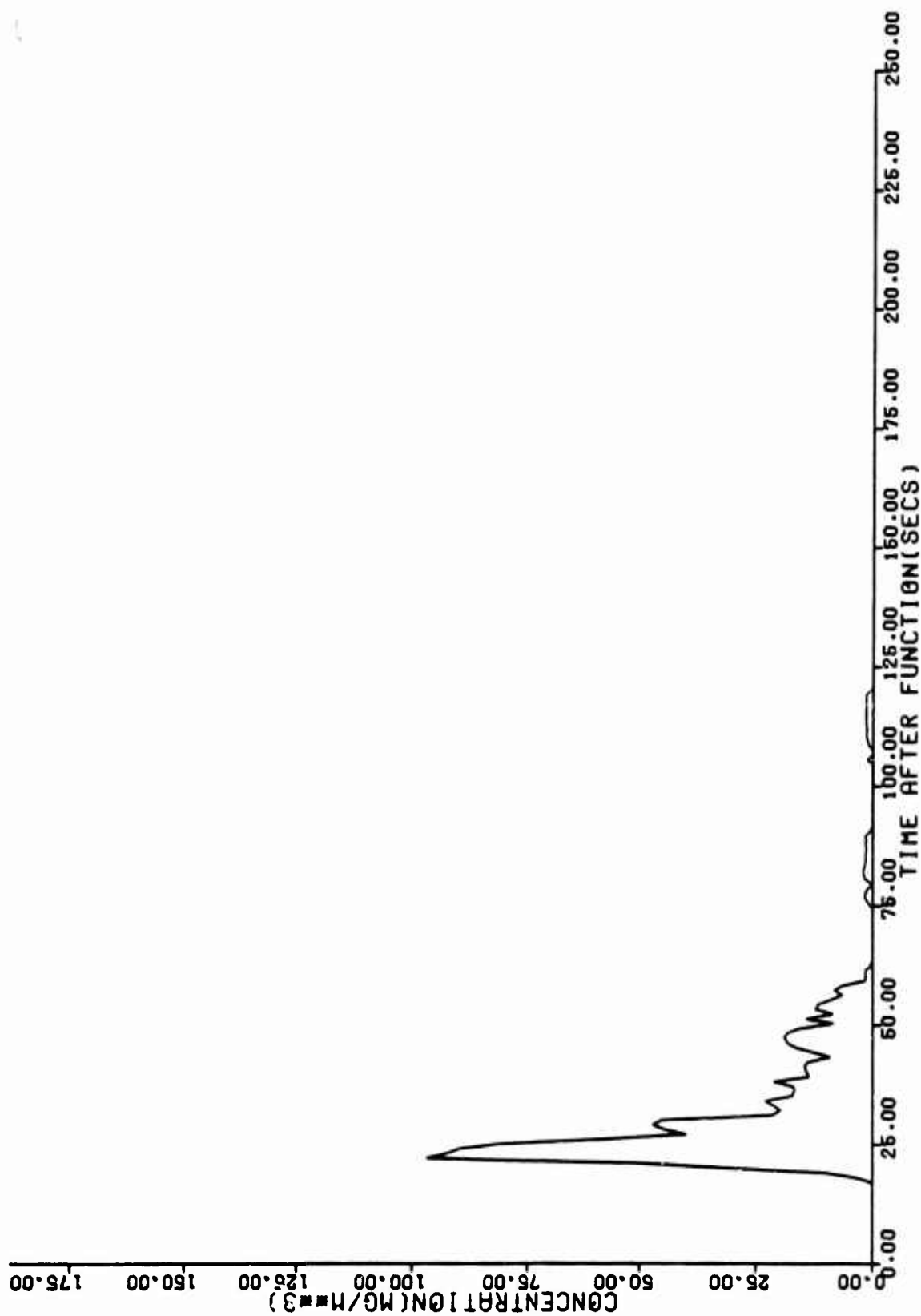
TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



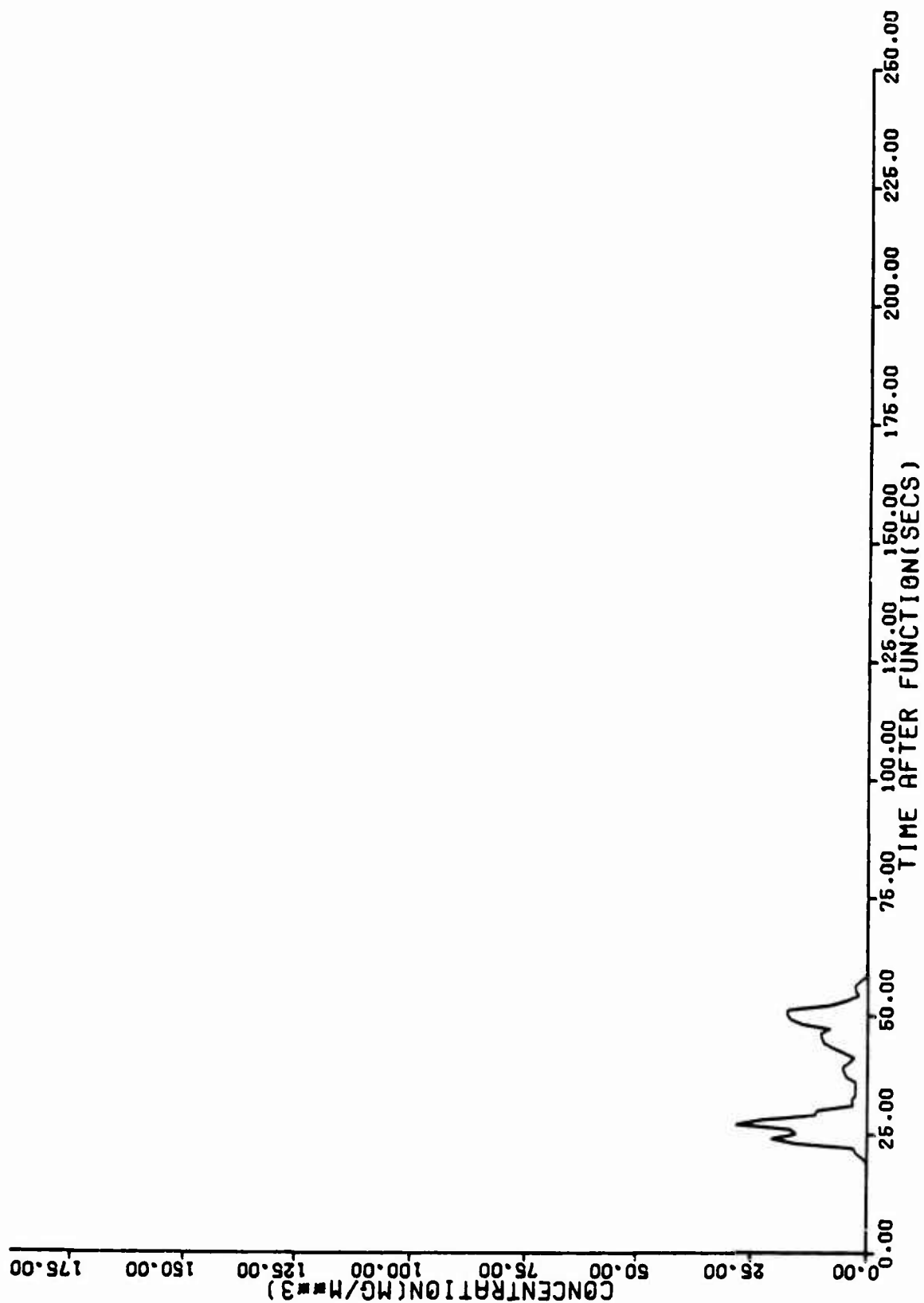
TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



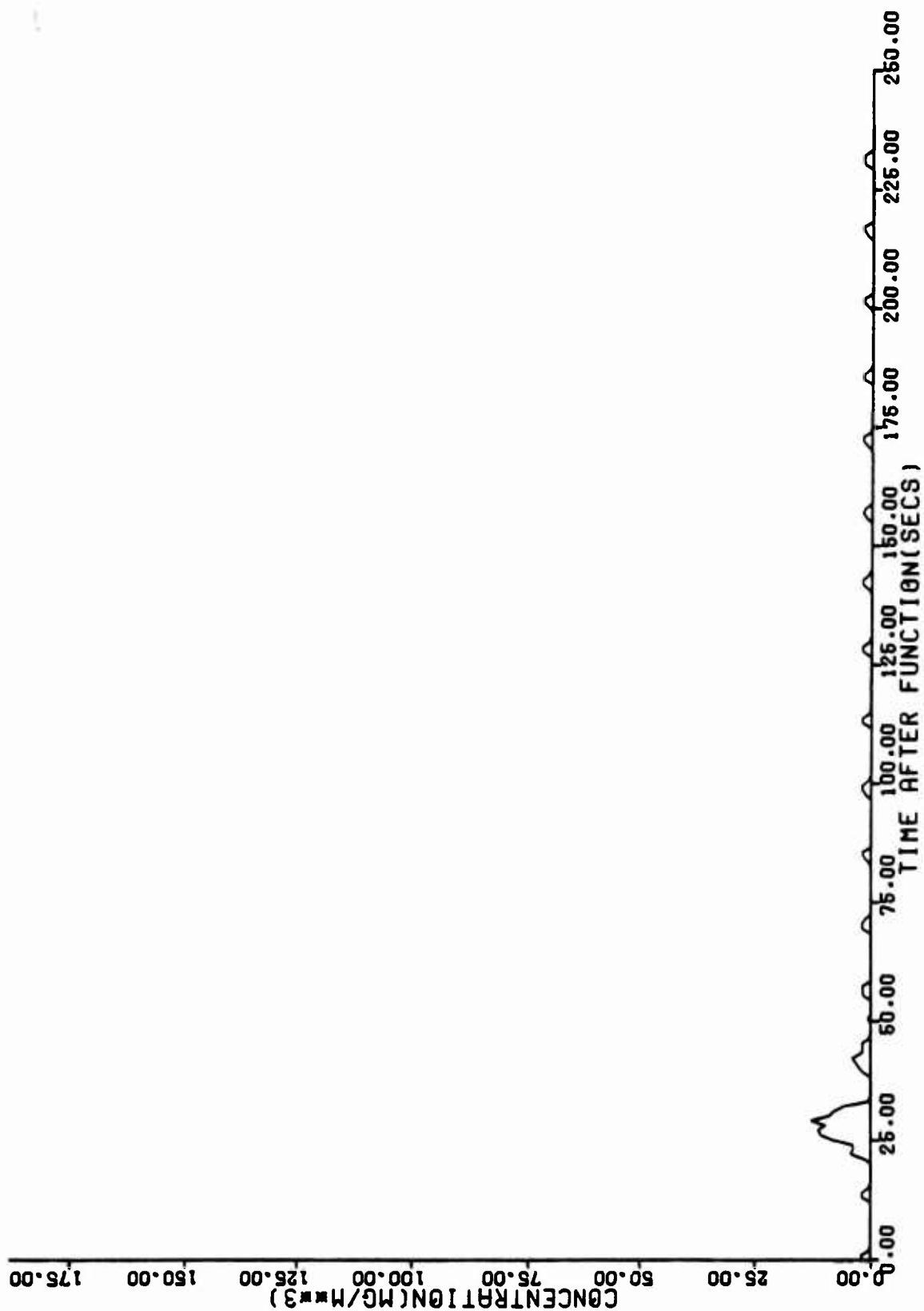
TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



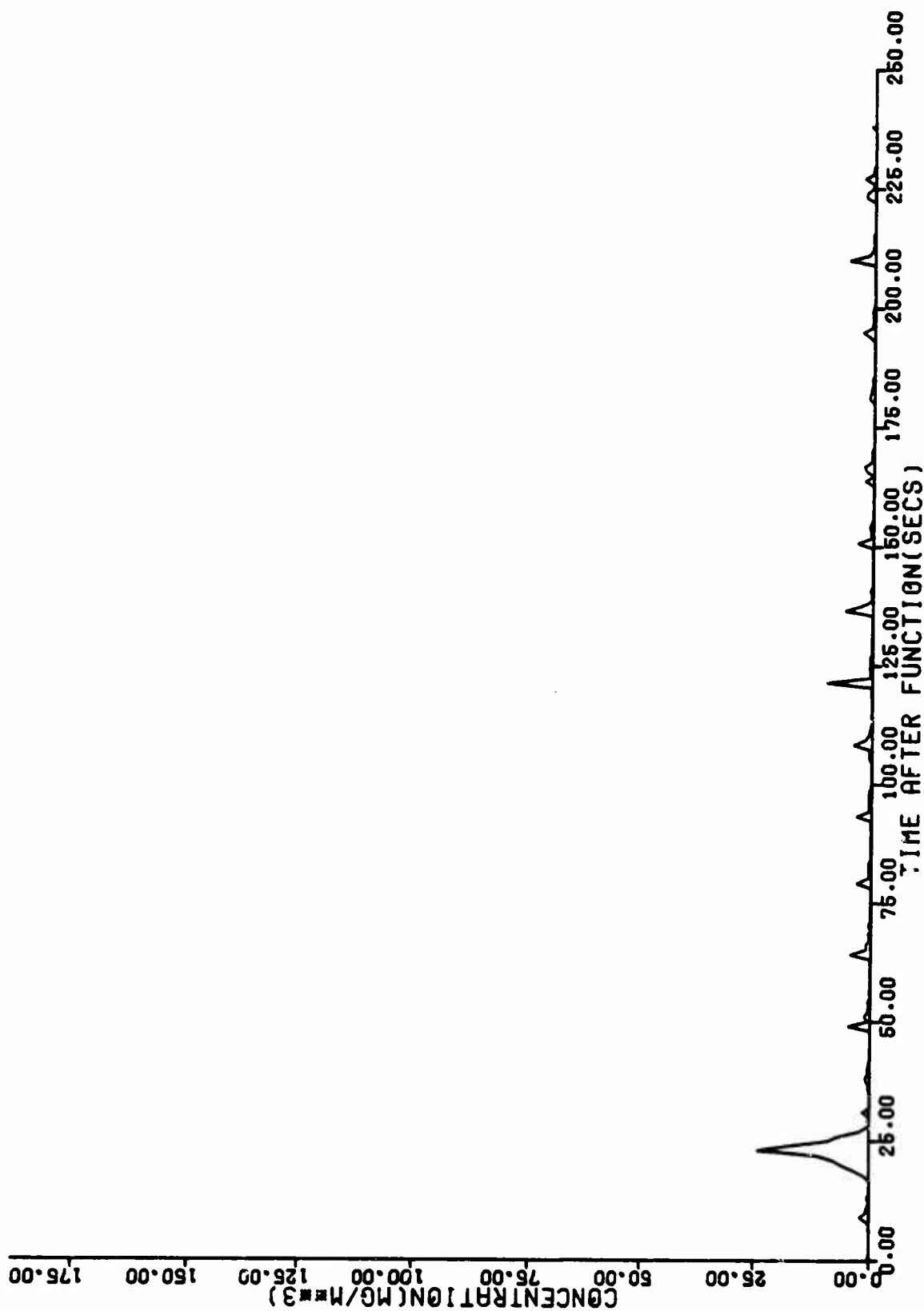
TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

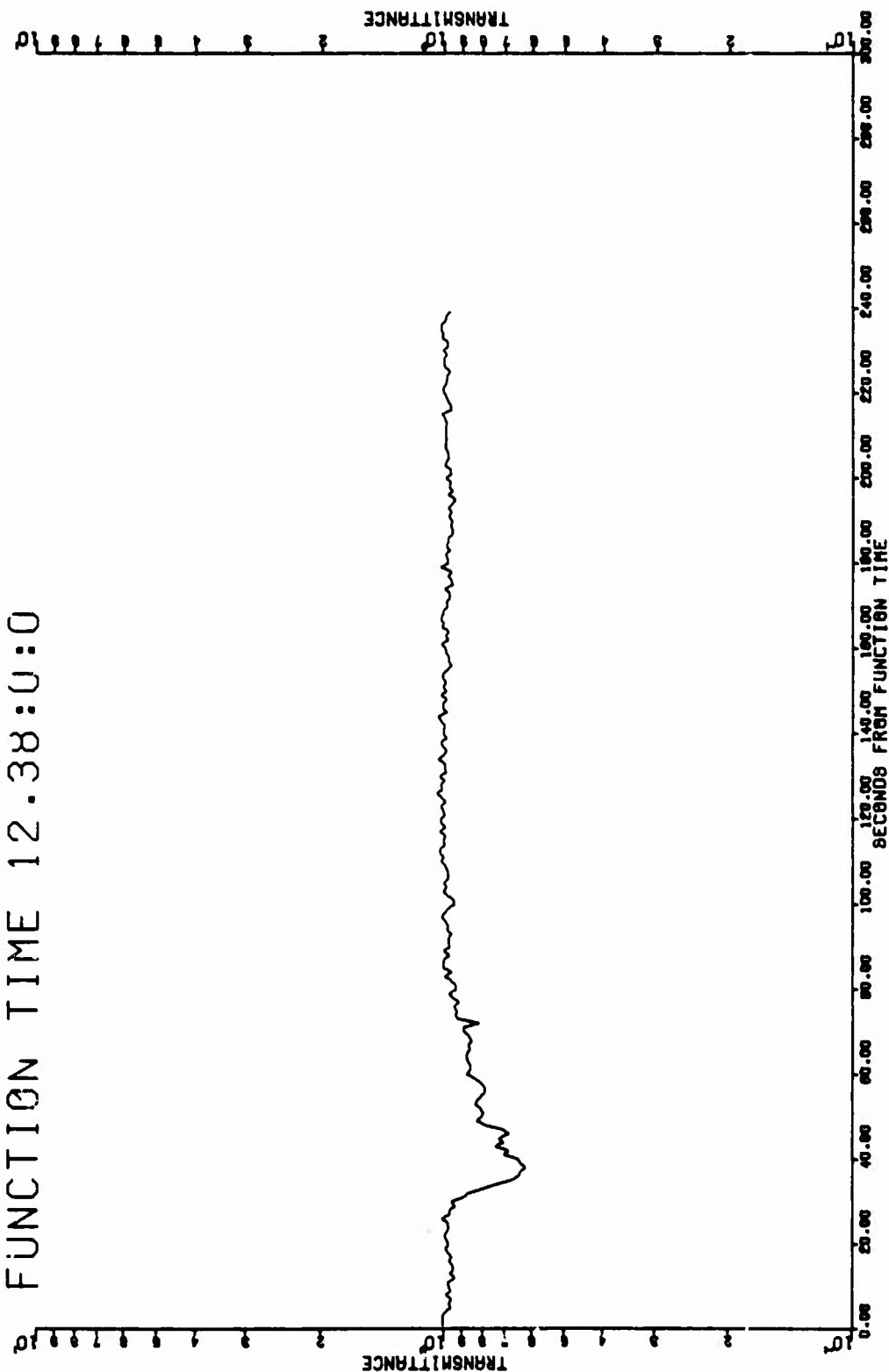
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



TRIAL 7 (DP-1002), 7 OCT 1977, 12:38:00, WP SMOKE

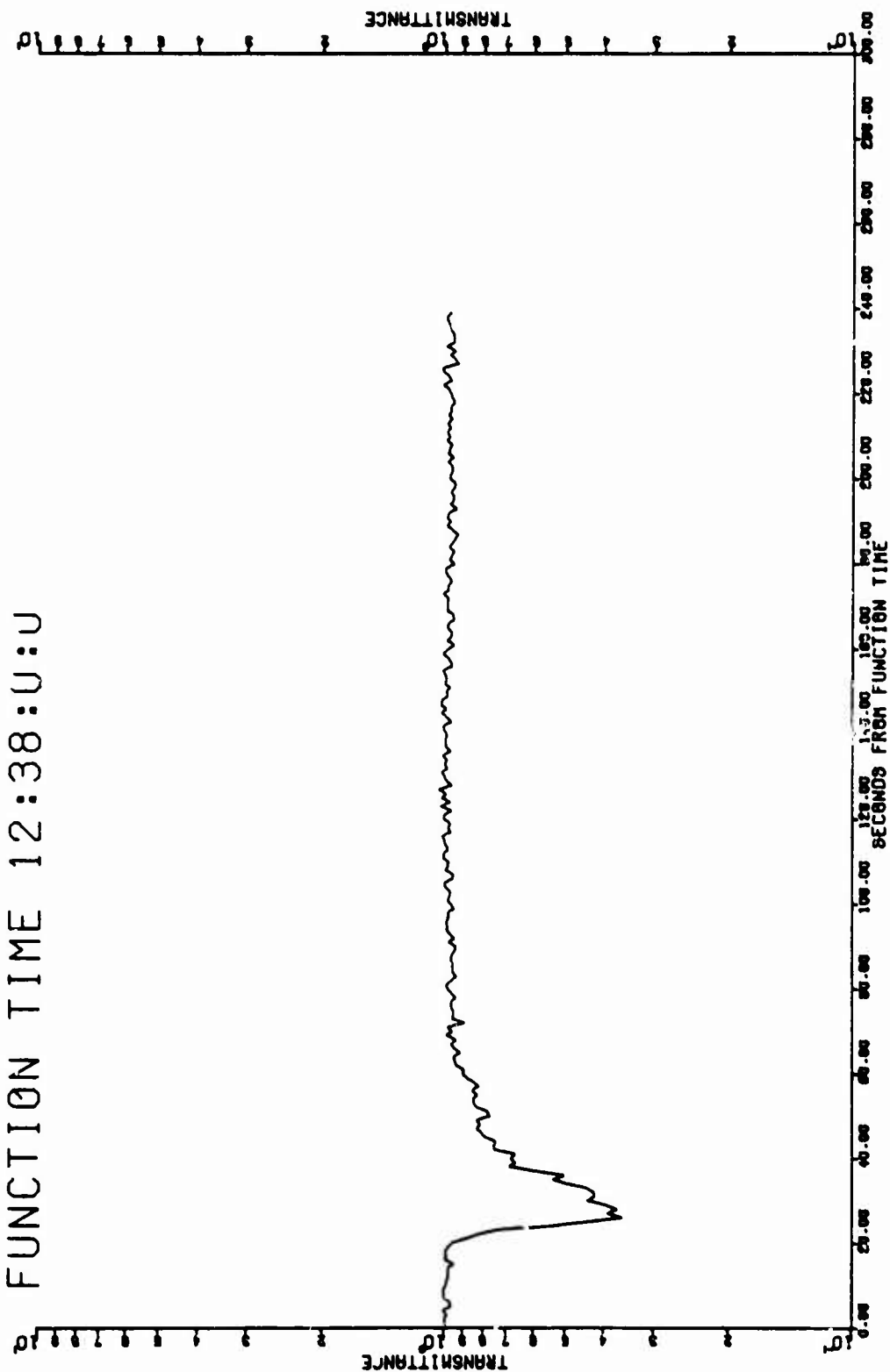
AEROSOL PHOTOMETER #4, X=0.00, Y=66.00, Z=0.00

TRIAL #7 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 12.38:0:0



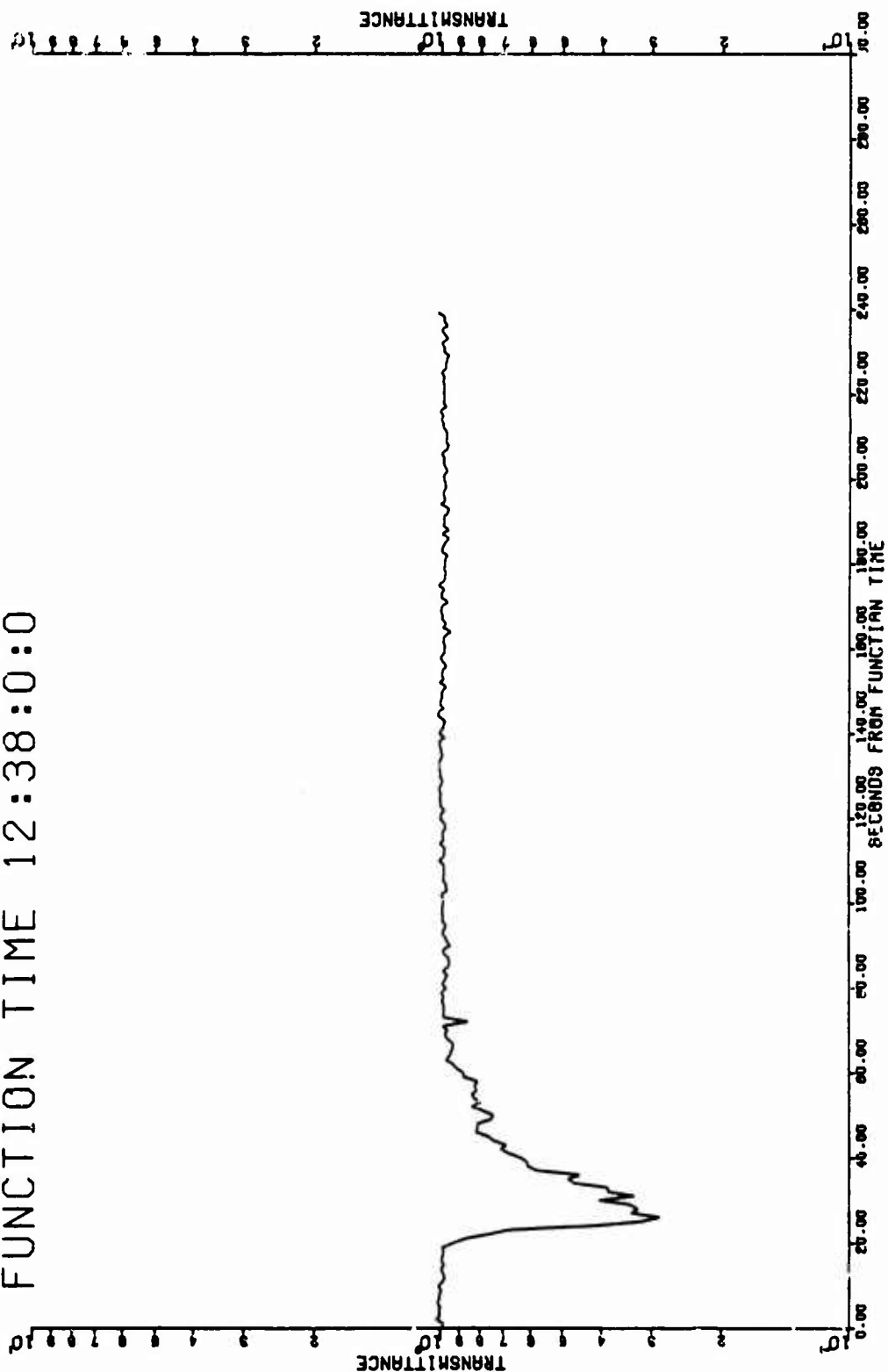
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.43 MICRONS ON ROW M

TRIAL #7 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 12:38:U:U



TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 MICRONS ON ROW 0

TRIAL #7 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:0:0



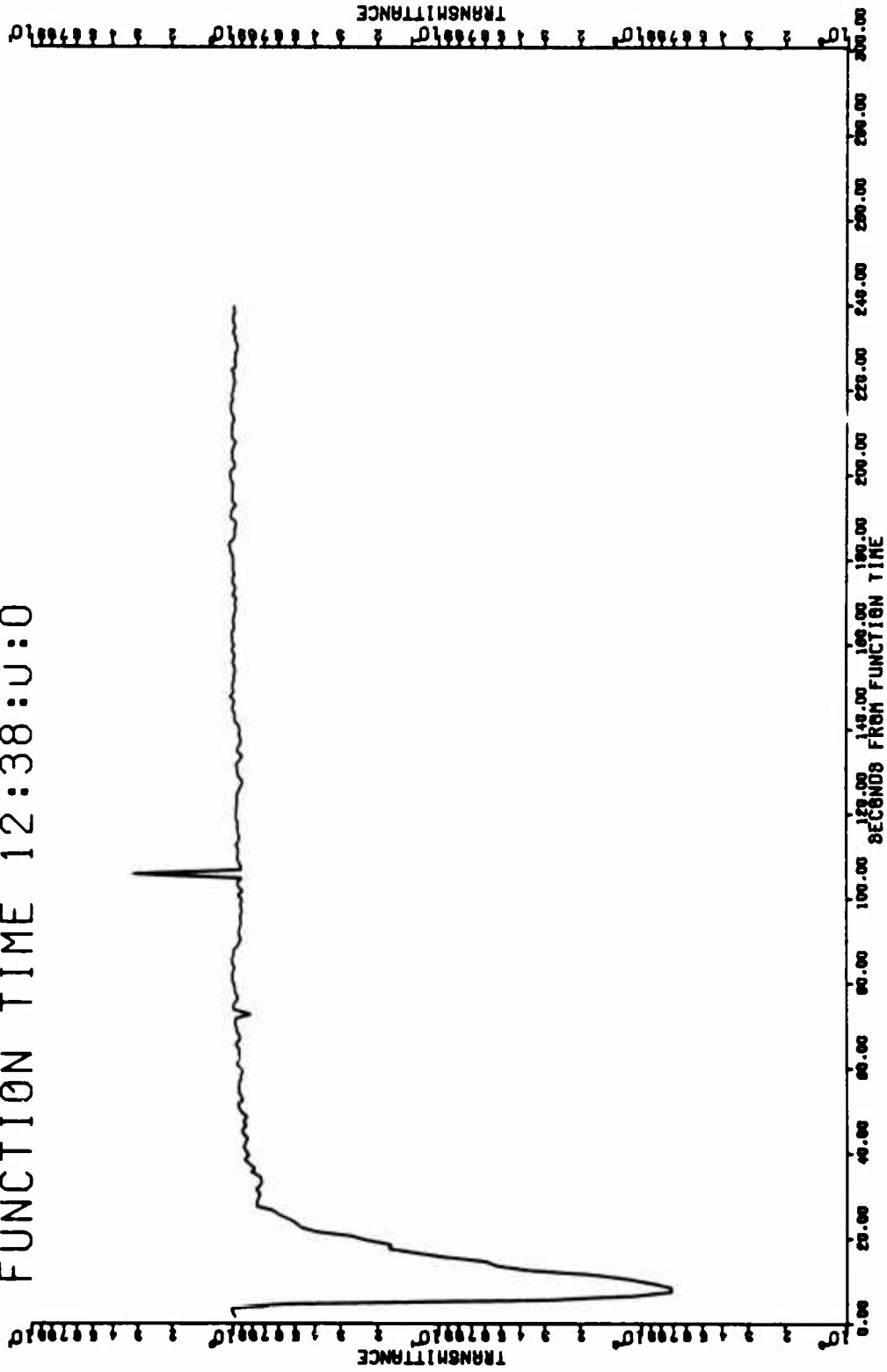
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #7 (DP1-002)

DATE: 7 OCT 1977

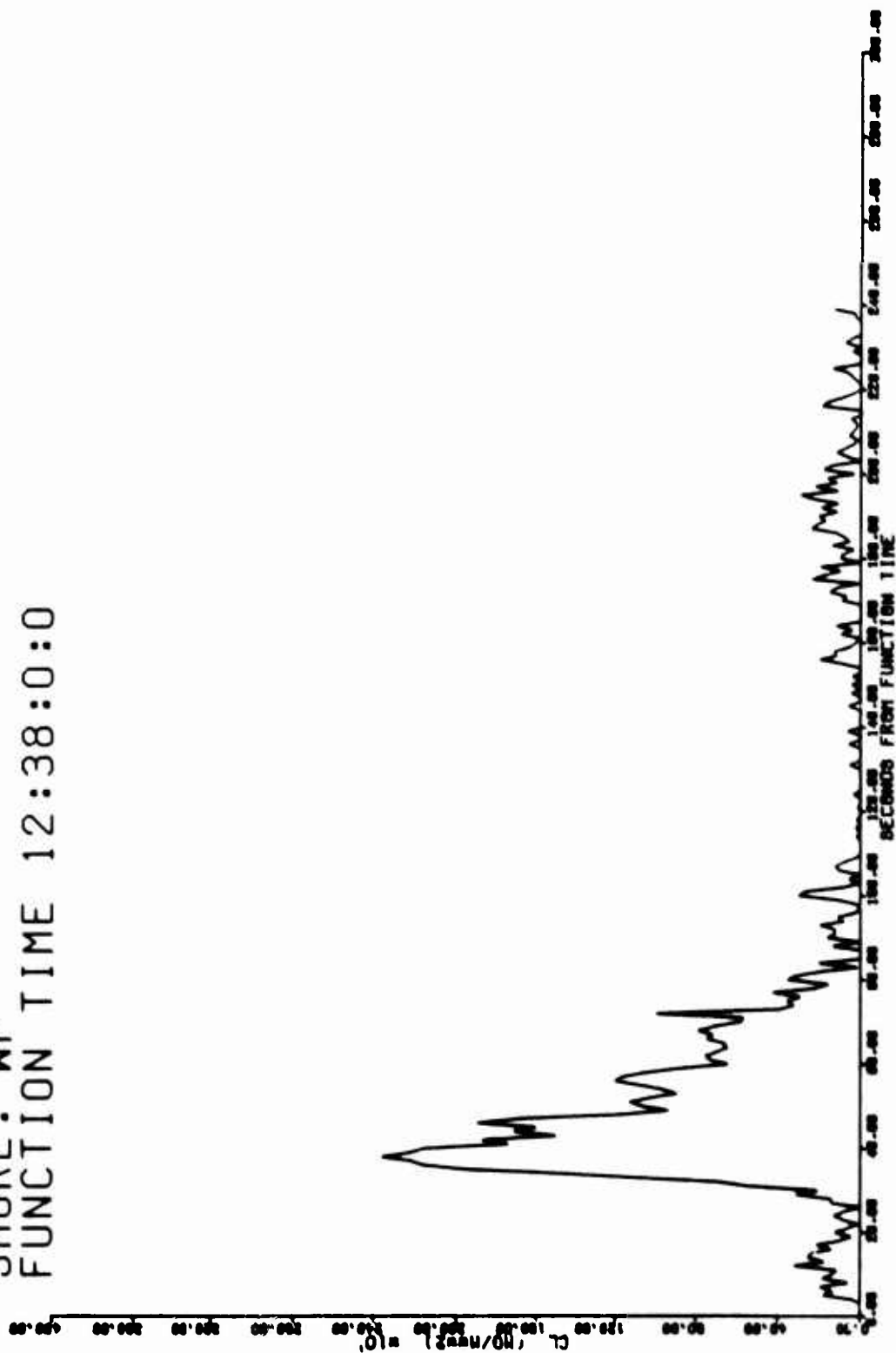
SMOKE: WP

FUNCTION TIME 12:38:U:0



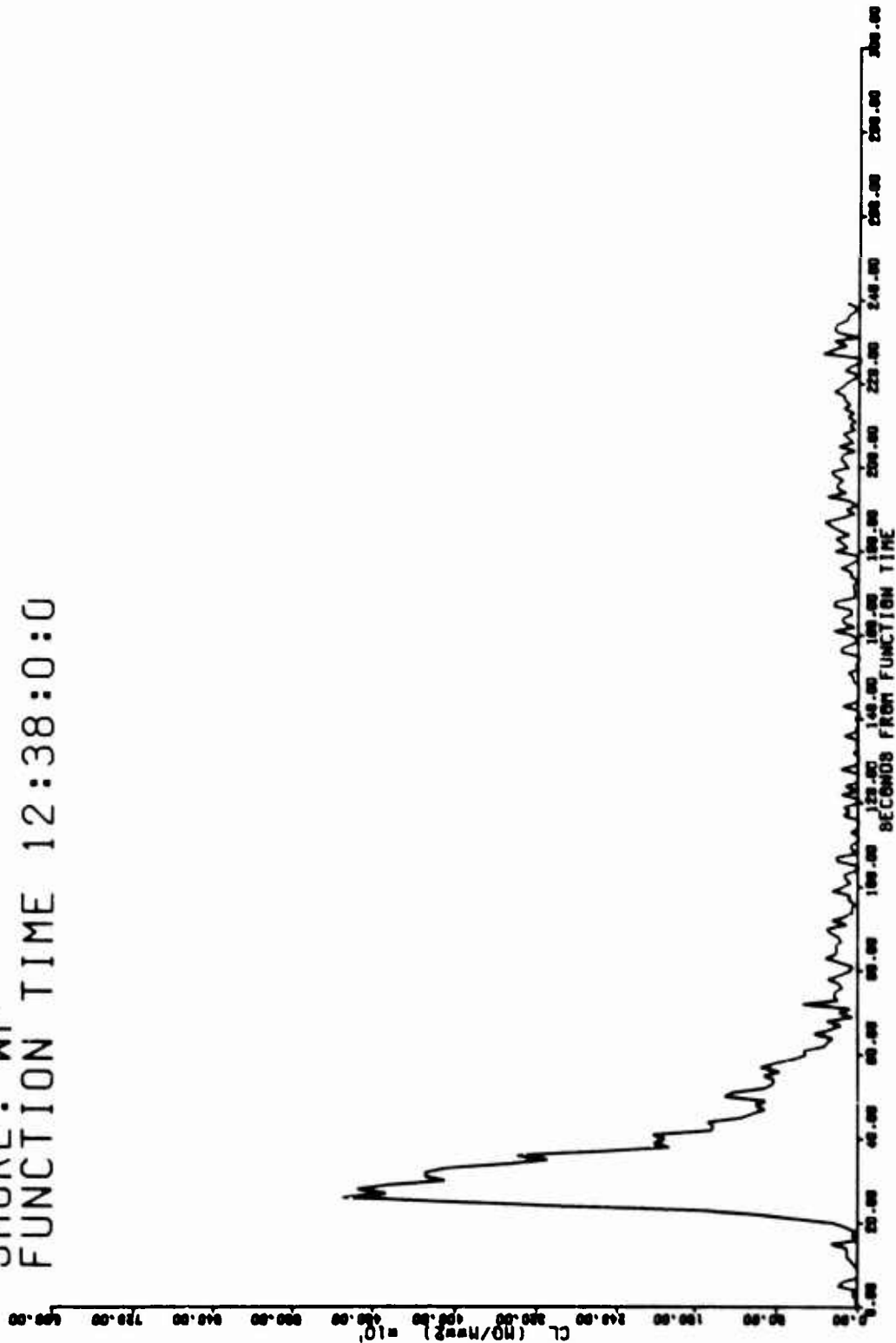
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #7 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:0:0



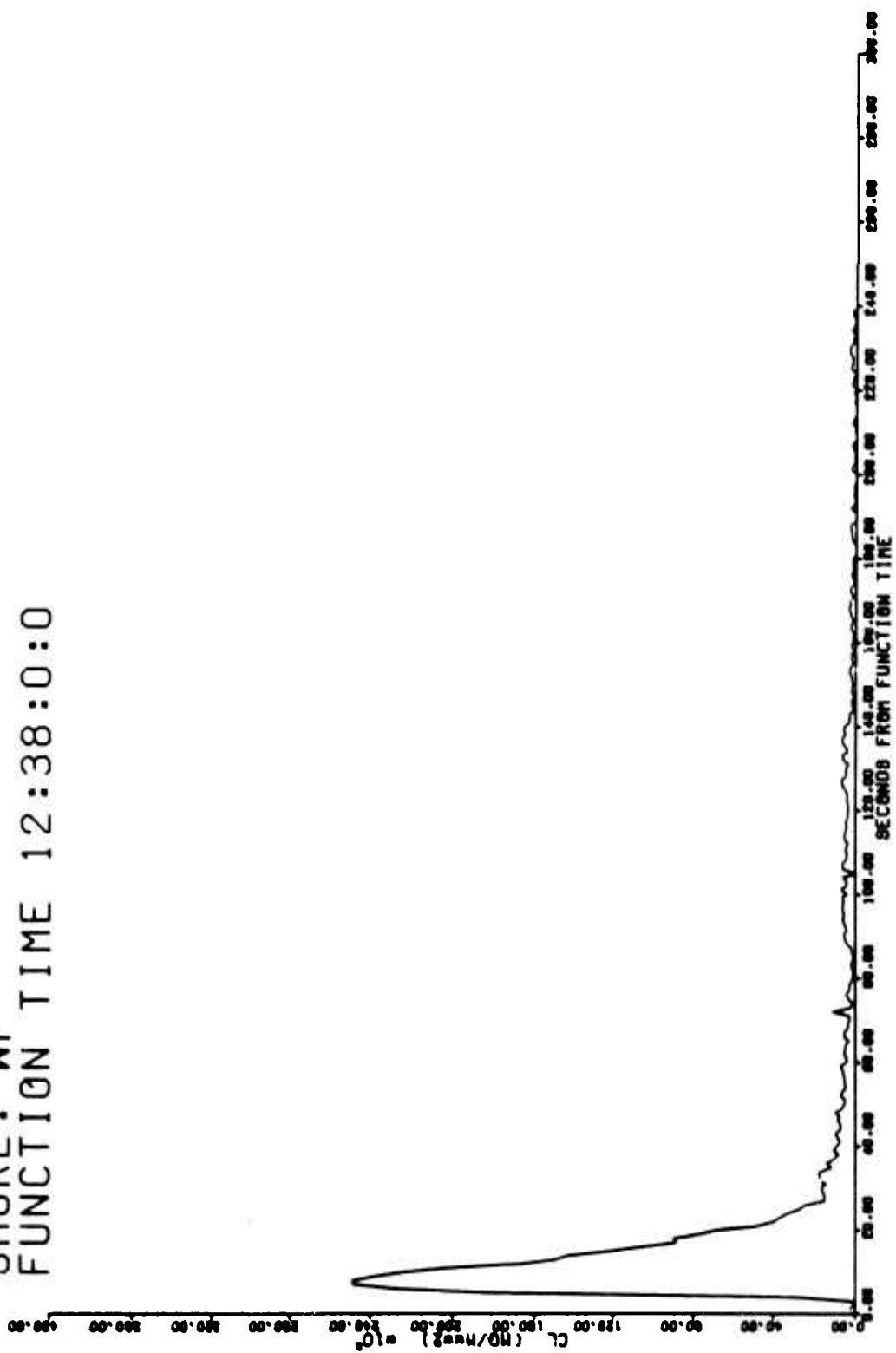
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINGUISH COEFFICIENT

TRIAL #7 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:0:0



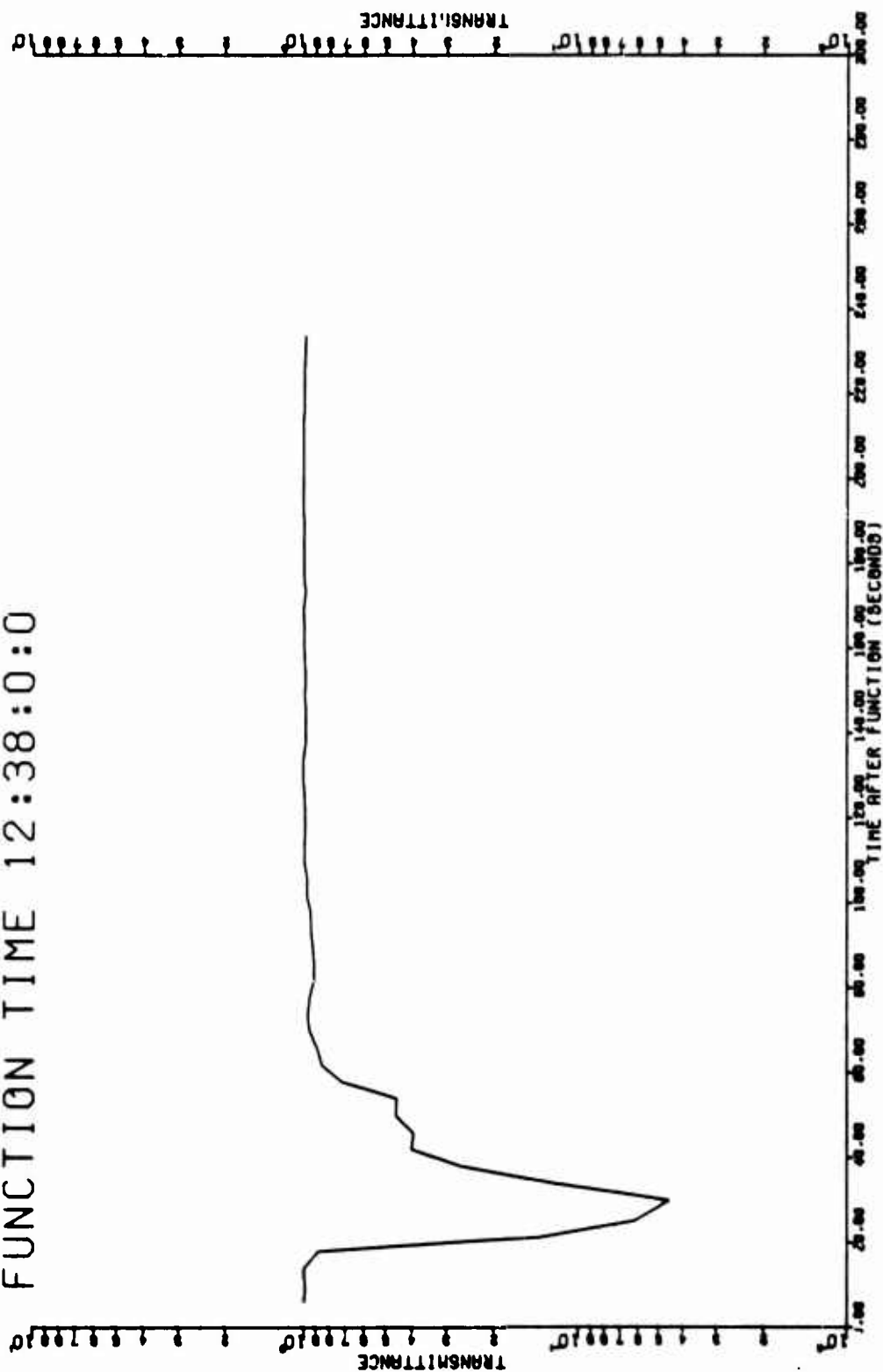
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #7 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:0:0



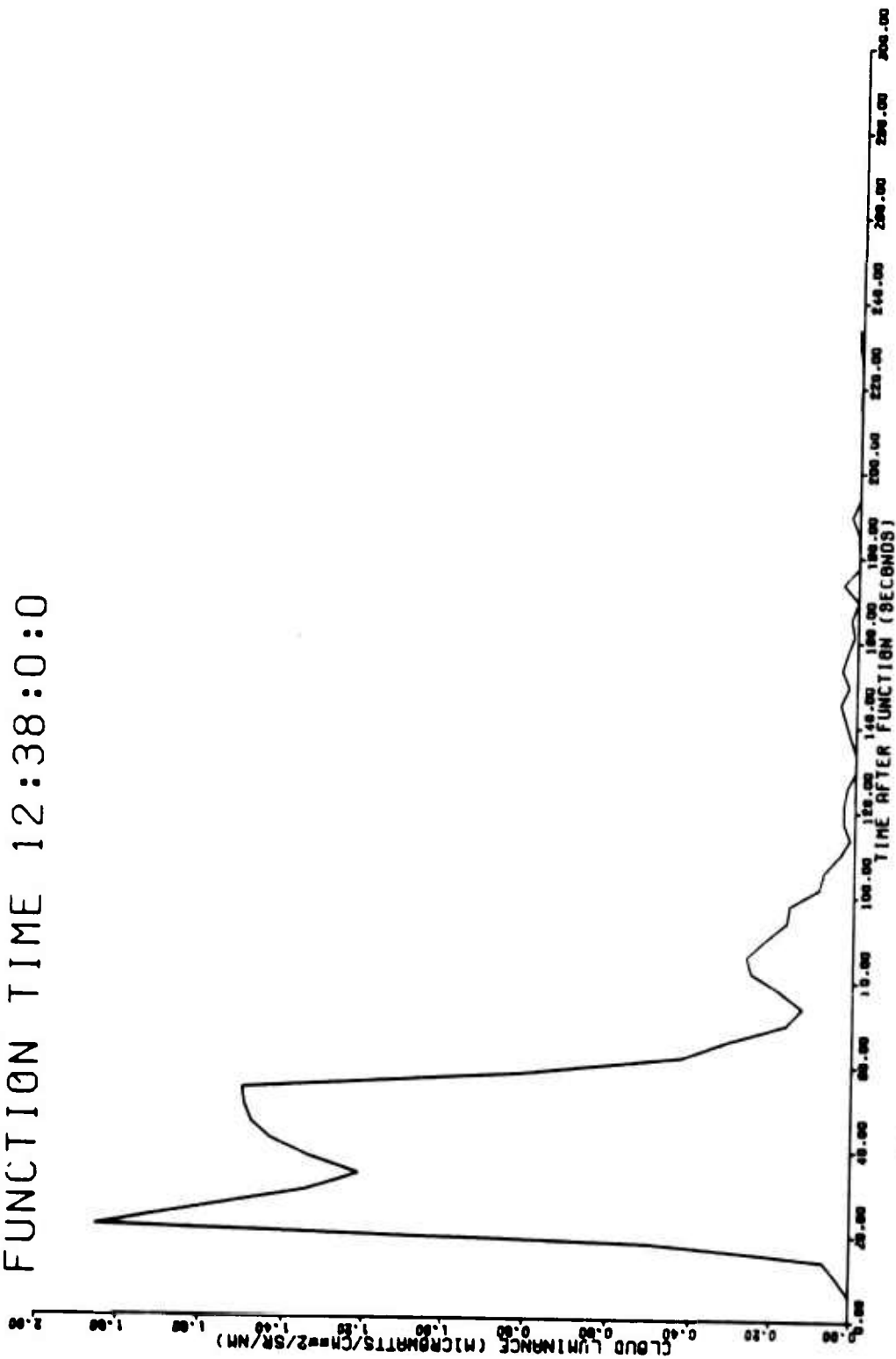
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #7 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 12:38:0:0



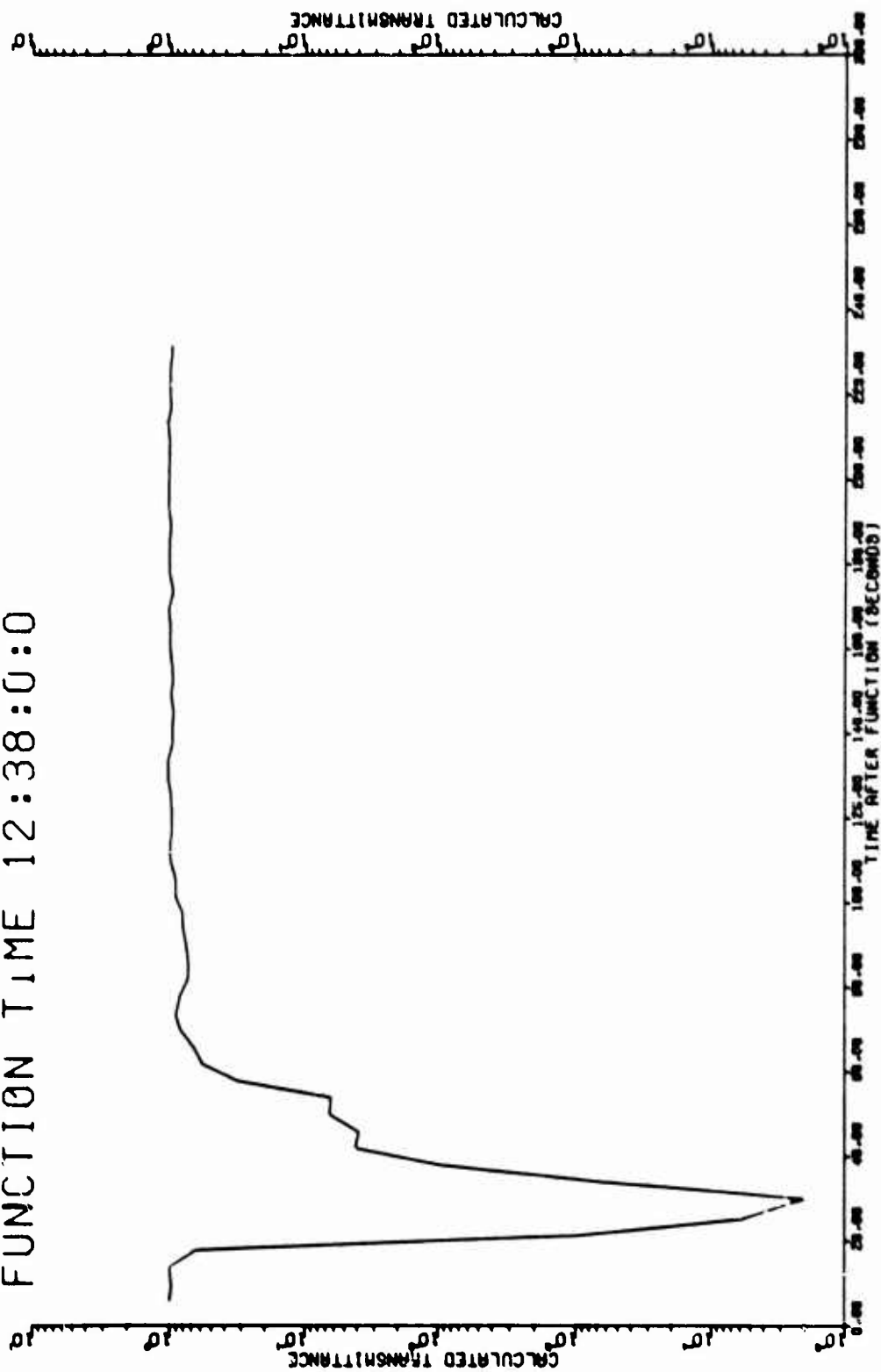
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #7 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:0:0



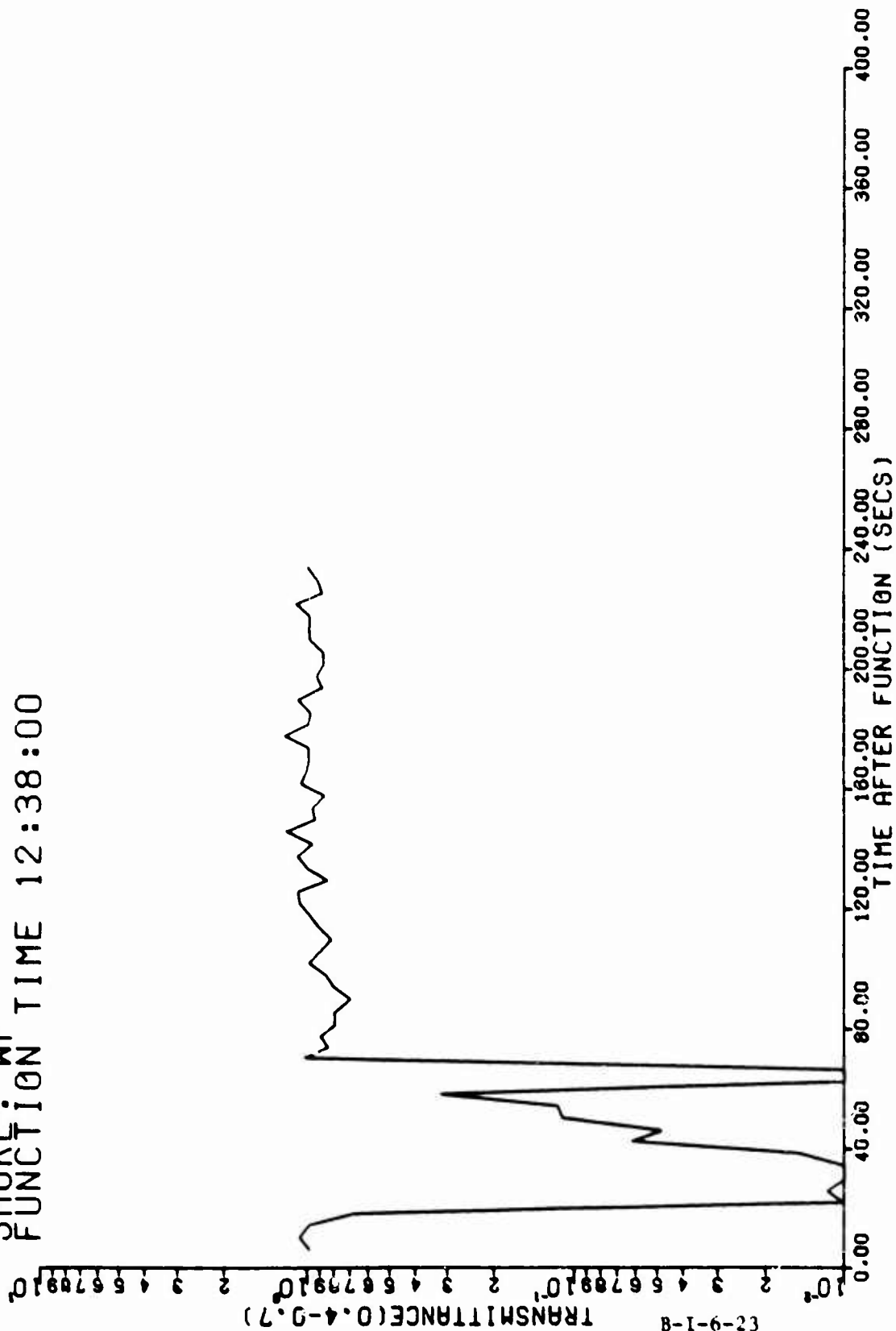
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #7 (DP1-002)
DATE: 7 JCT 1977
SMOKE: WP
FUNCTION TIME 12:38:0:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

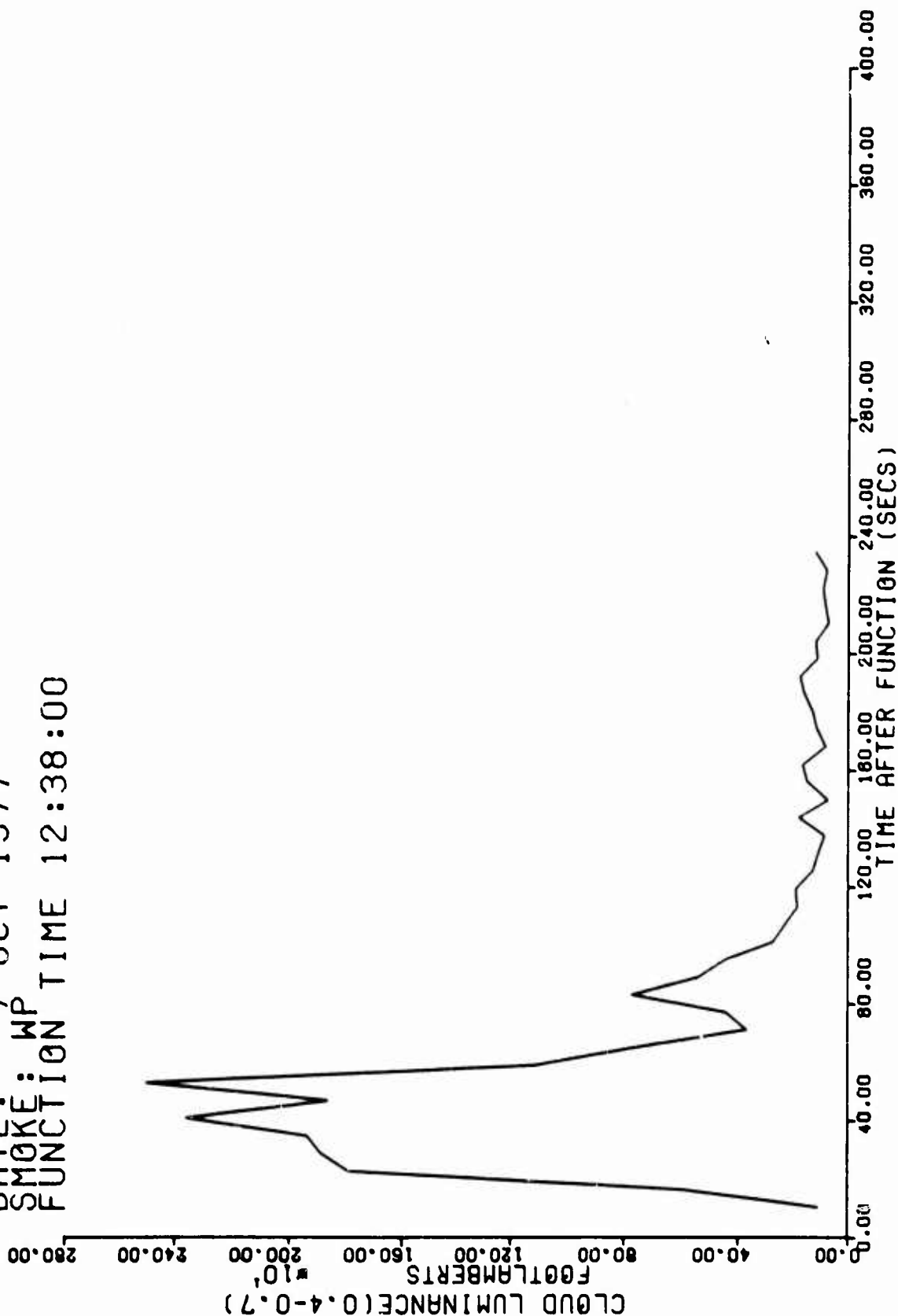
TOTAL 7 (DP-1002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:00



B-I-6-23

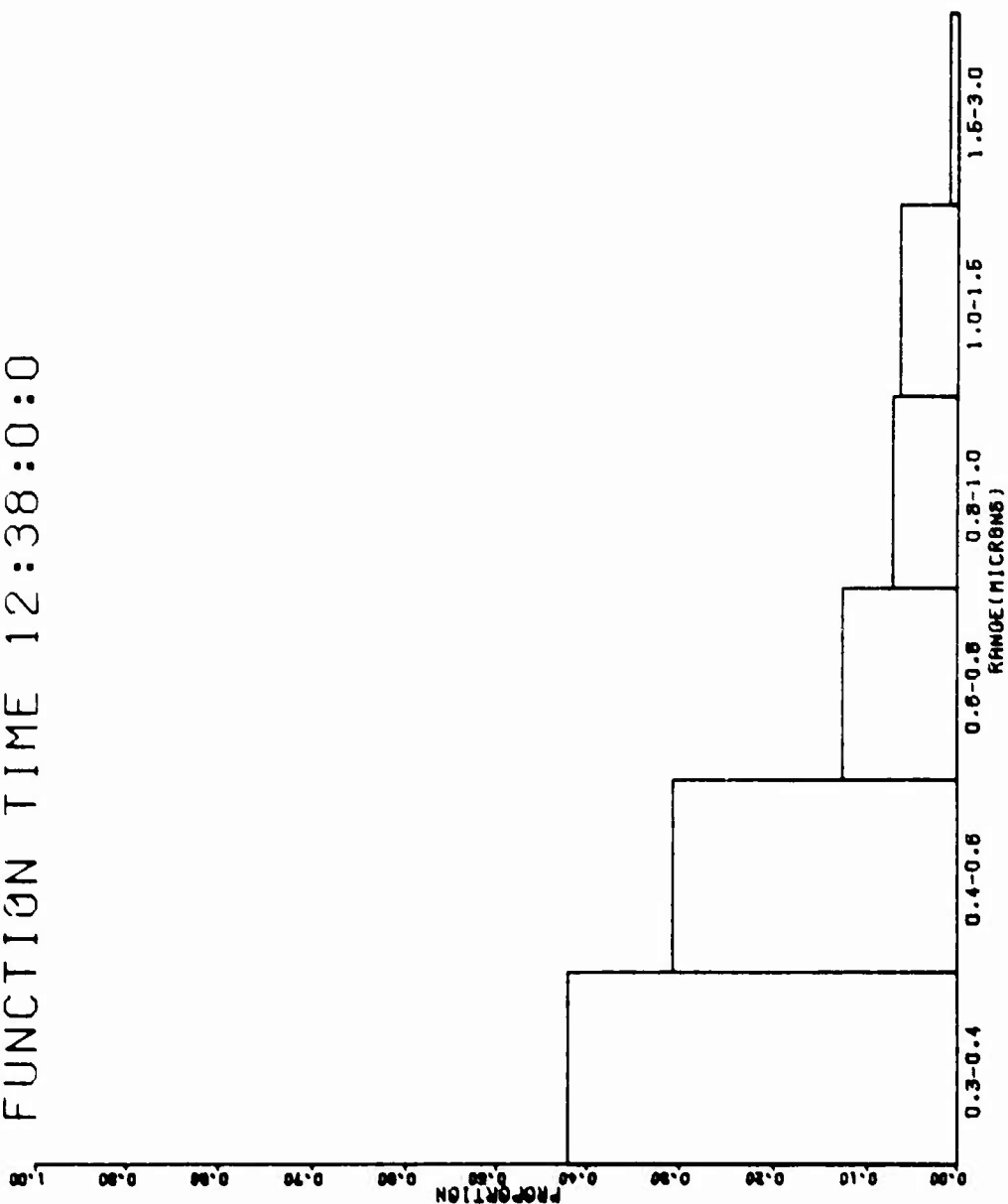
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
 . 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 7 (DP-1002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:38:00



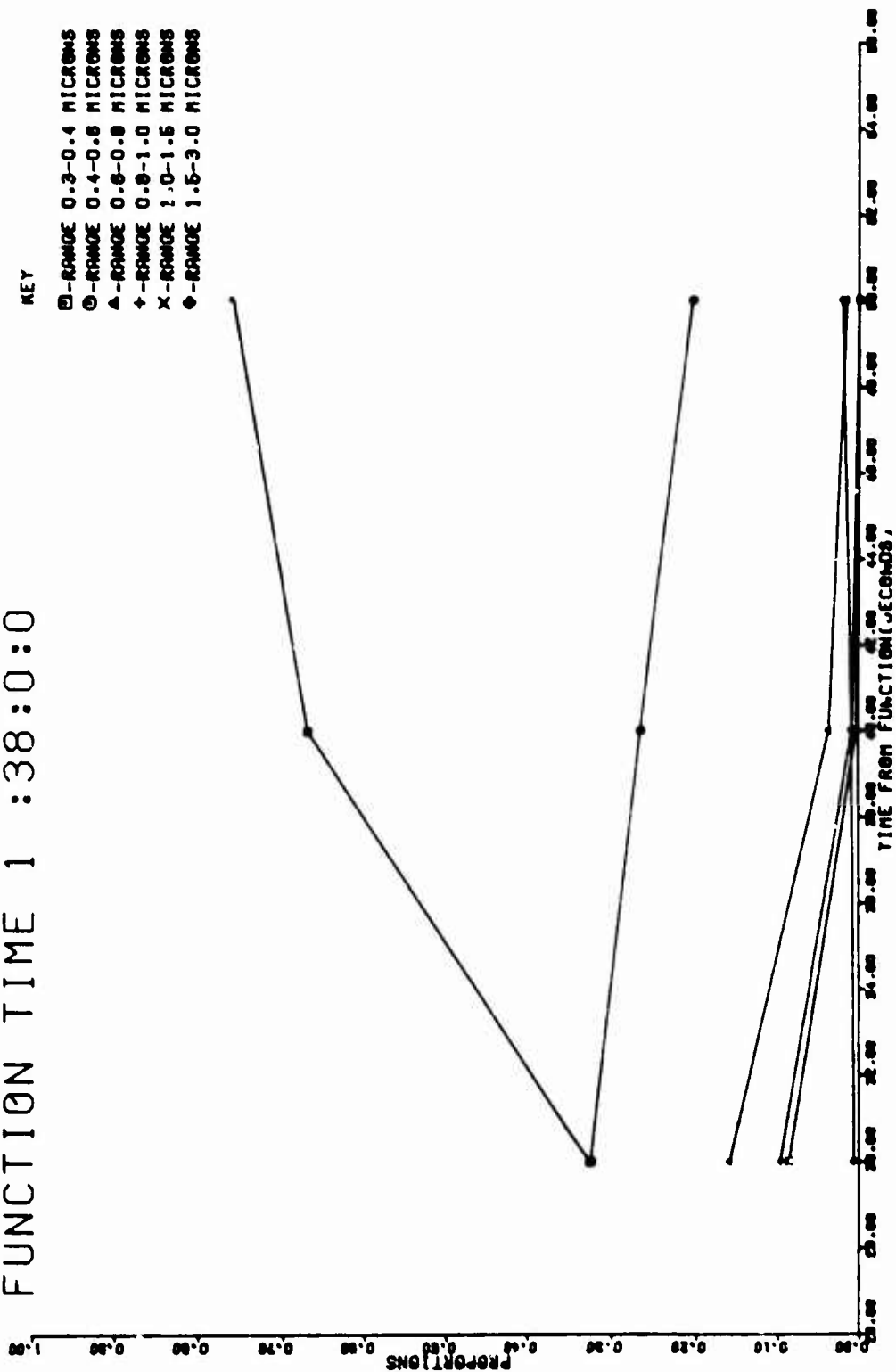
CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #7 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 12:38:0:0



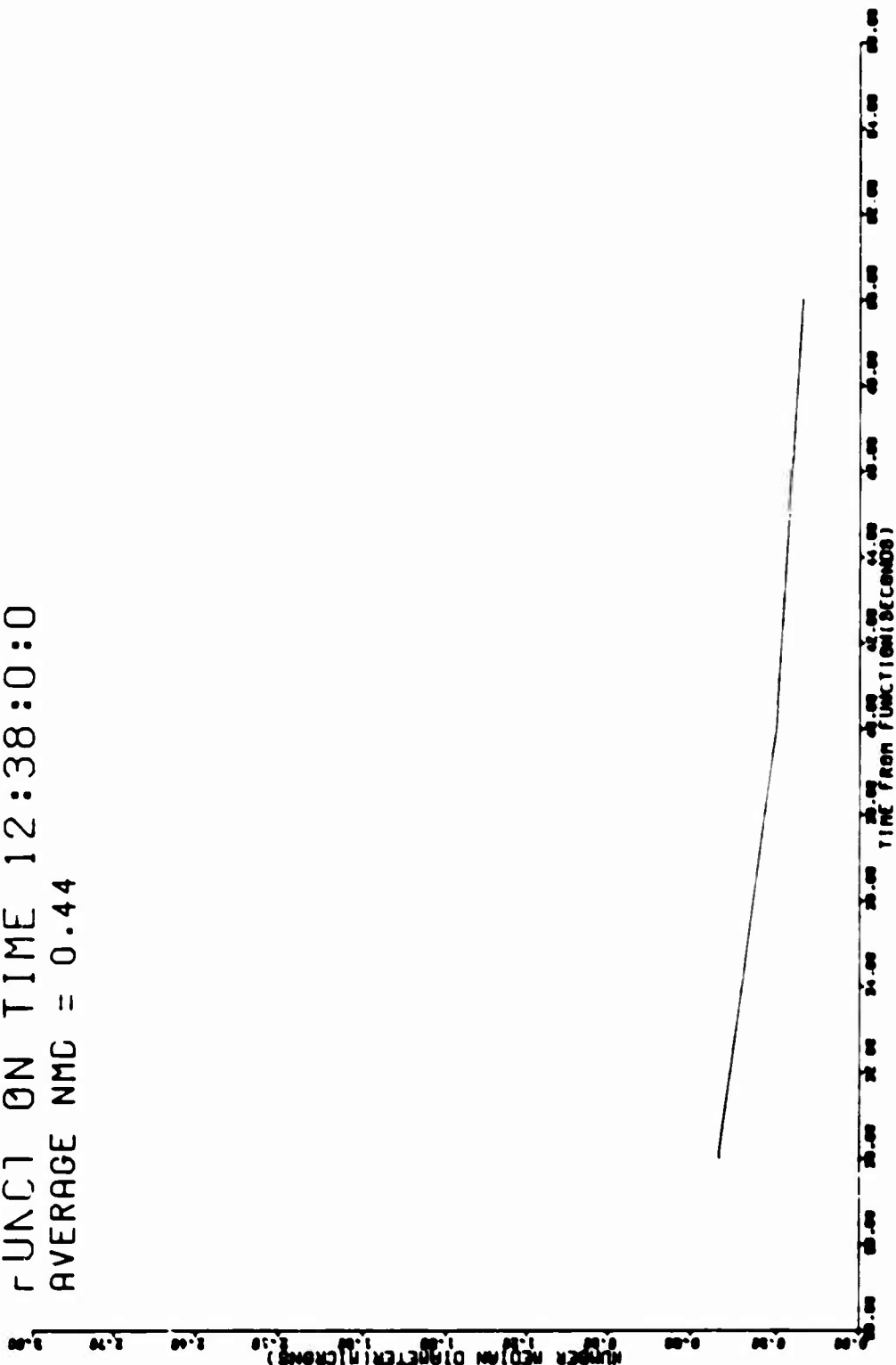
PARTICLE SIZE DISTRIBUTION BASED ON NUMBER

TRIAL #7 CP1 U2)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 1 :38:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME FROM FUNCTION

TRIAL #7 (DP1-'12)
 DATE: 7 OCT 19
 SMOKE: WP
 FUNCTION ON TIME 12:38:0:0
 AVERAGE NMC = 0.44



AVERAGE NMC AS A FUNCTION OF TIME

APPENDIX B-I-7

TRIAL DP1-002-T-9 (WP SMOKE) 23 SEP 1977

SUMMARY OF TEST DATA	B-I-7-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-7-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-7-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-7-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-7-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-7-16
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-7-17
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-7-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-7-19
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-7-20
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-7-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-7-22
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-7-23
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-7-24
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-7-25

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 B-I-7-26

FIGURE: PARTICLE SIZE DISTRIBUTION ND

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME ND

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME ND

SUMMARY OF TEST DAY DATA

Trial: 9

Date: 23 Sep 77

Time: 1303 MDT

Wind Direction (Transport) (degrees) (4m)	157
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.8
Temperature at 2-meters, Trial Time (T , °C)	15.2
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	21.6
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	ND
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.15
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	34
Solar Azimuth (deg)	171.6
Solar Altitude (deg)	49.2
Air Density - ρ (kg m ⁻³)	1.05946
Solar Radiation (Langley's per minute)	1.325
Barometric Pressure (millibars)	869.5
Visibility (km)	137
Reflectivity, OD Target	0.11
Haze (footlamberts)	27
Brightness, Background (footlamberts)	1027
Brightness, White Target (footlamberts)	1375
Brightness, OD Target	185
Percent Opaque Cloud Cover	3

Munitions/Submunitions Used (WP, 4.2 inch) 1

Number of Munitions/Submunitions Functioned 1

Particle Size Range (micron)*

(0.3 - 0.4)

(0.4 - 0.6)

(0.6 - 0.8)

(0.8 - 1.0)

(1.0 - 1.5)

(1.5 - 3.0)

Log₁₀NMD

°Log₁₀NMD

NMD

MMD

* No data Available

Initial Cloud Dimensions (Meters)

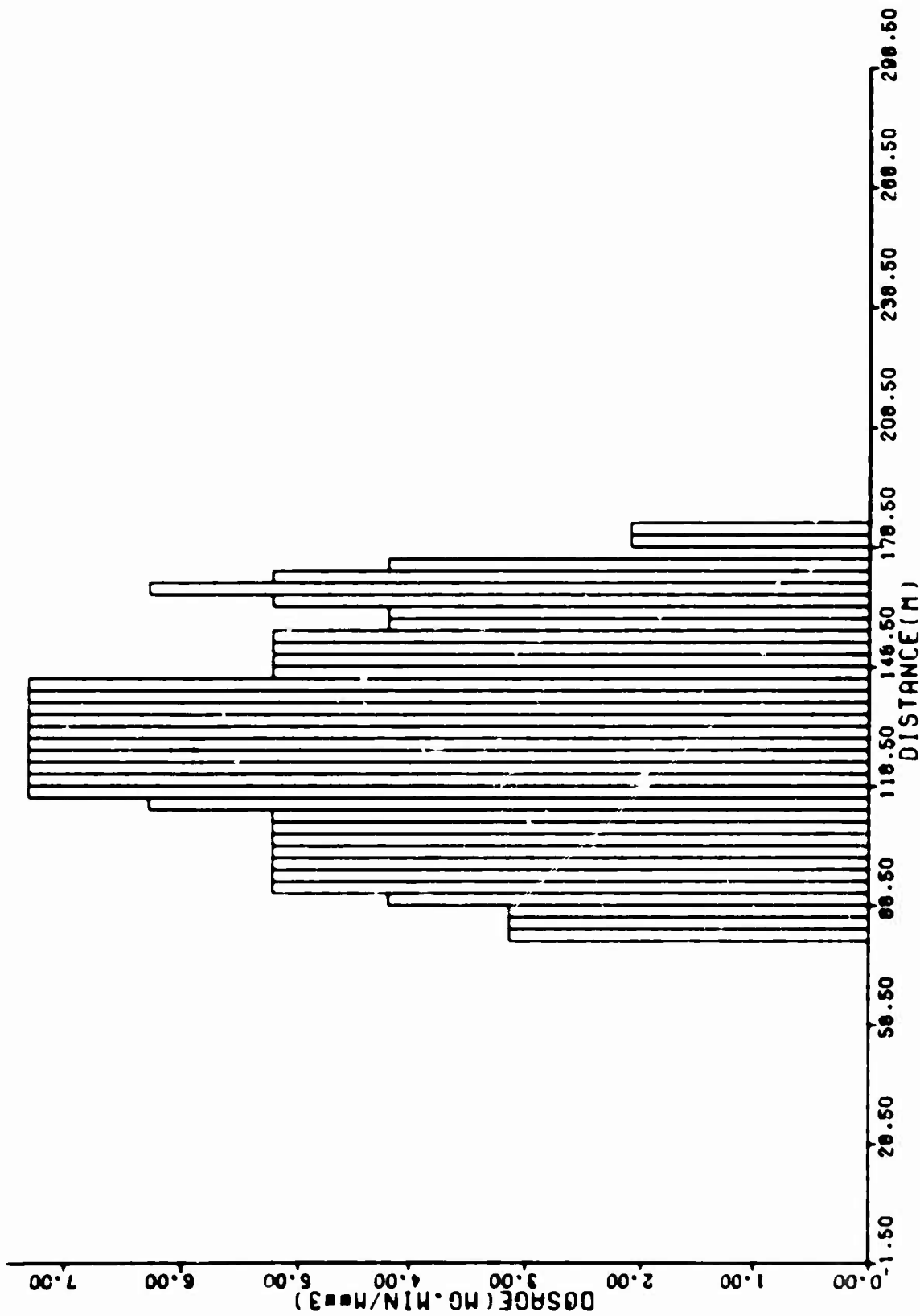
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>	
1303:00	8	9	5	(Ground level)
1303:10	17	28	30	
1303:20	23	33	58	
1303:30	27	43	87	
1303:40	Plume aloft			

SKY BRIGHTNESS

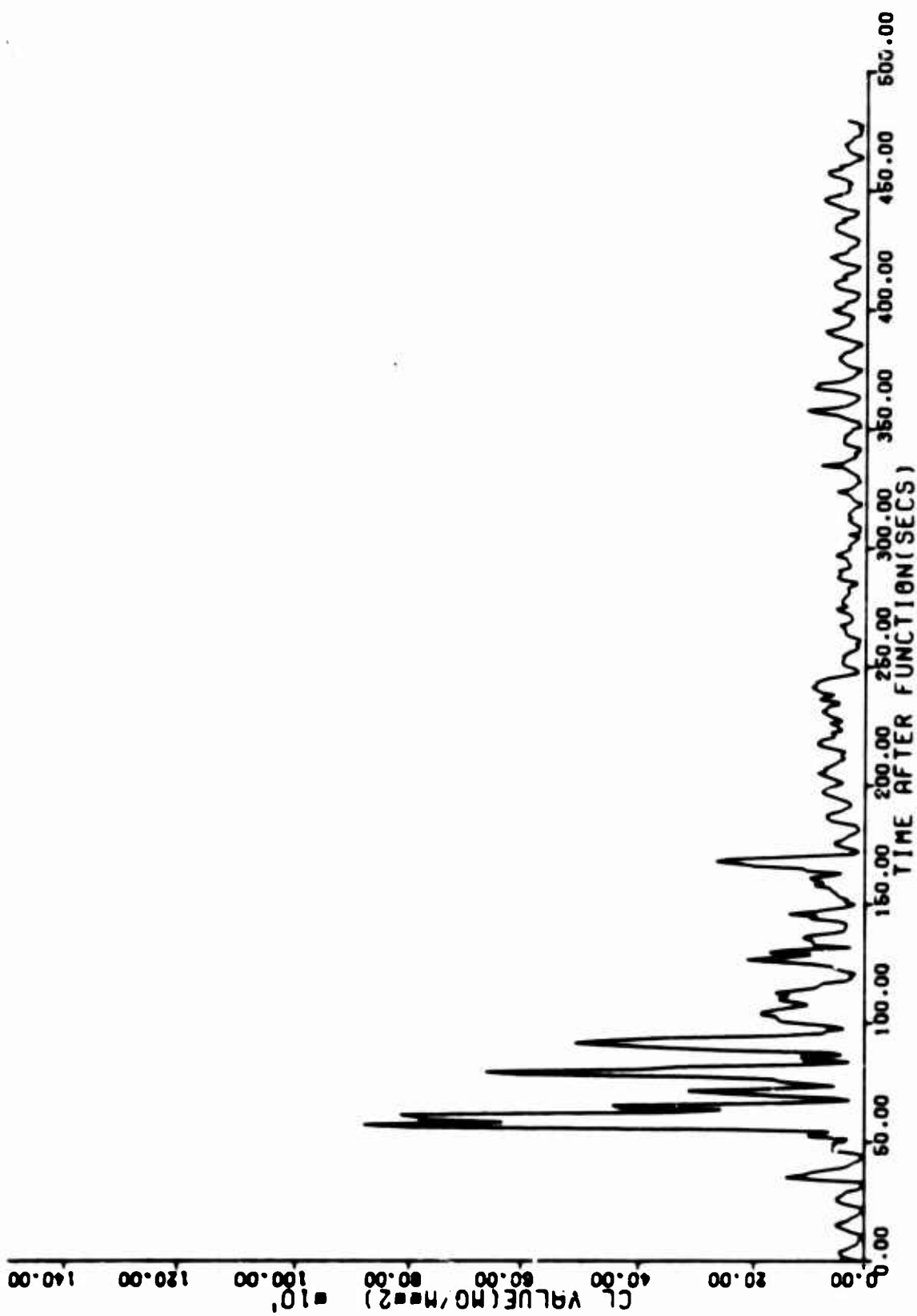
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	652
5	2212
10	2212
15	2212
20	2668
25	2668
30	2668
35	2328
40	2328
45	2328

Viewing azimuth 240° except 255° at 0 degrees elevation

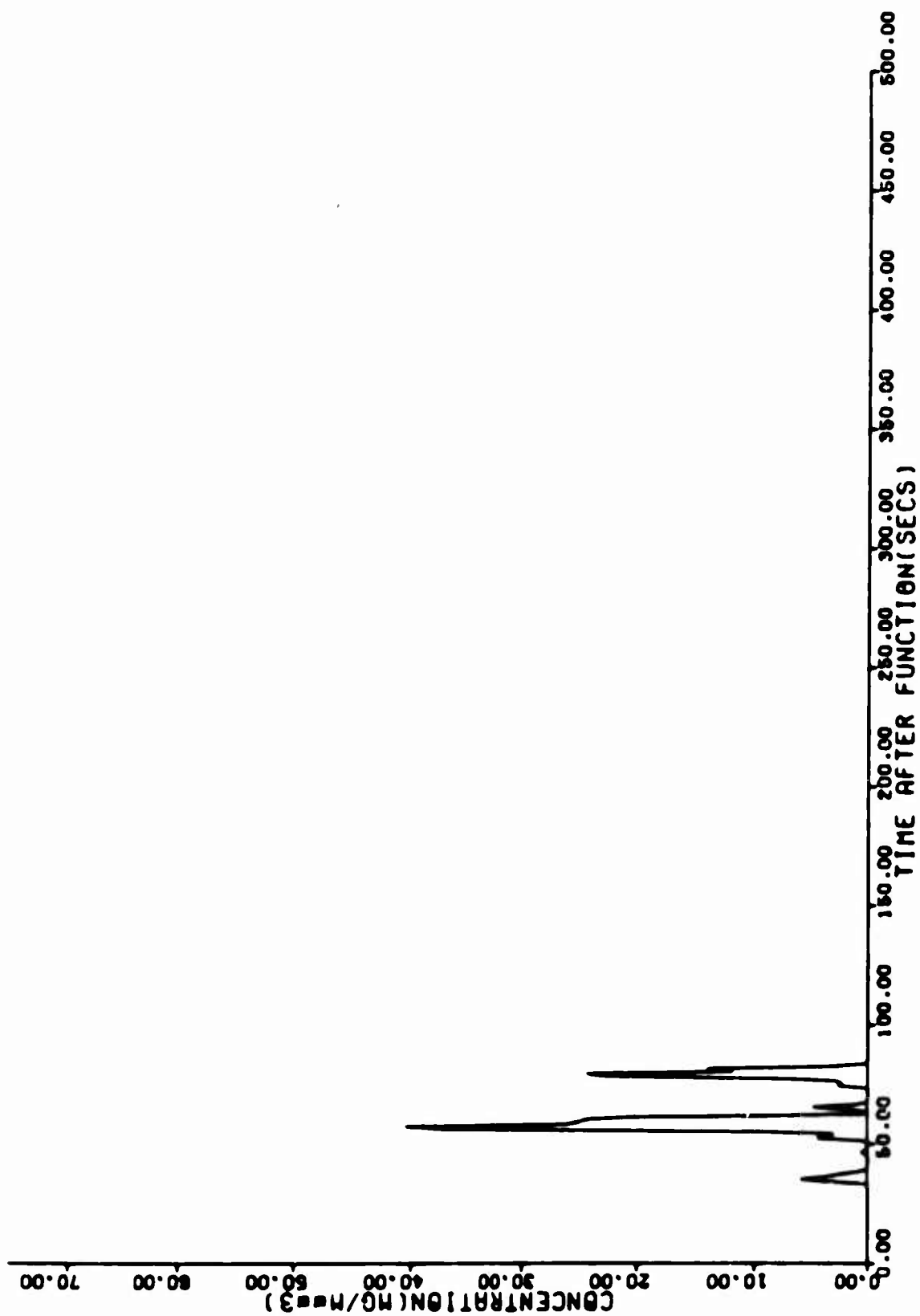


TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE



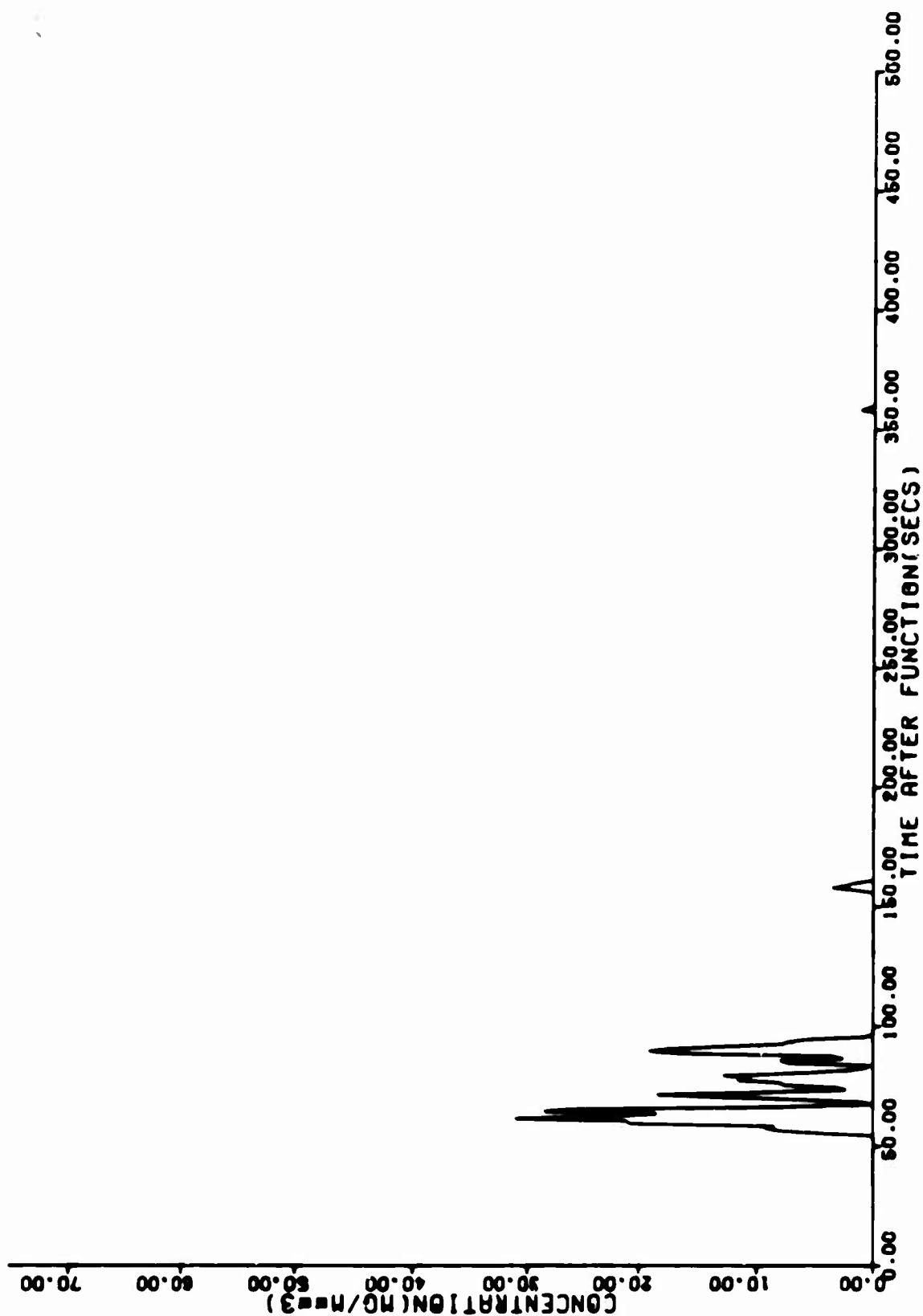
TRIAL 9 (DP-1002). 23 SEP 1977. 13:03:00. WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



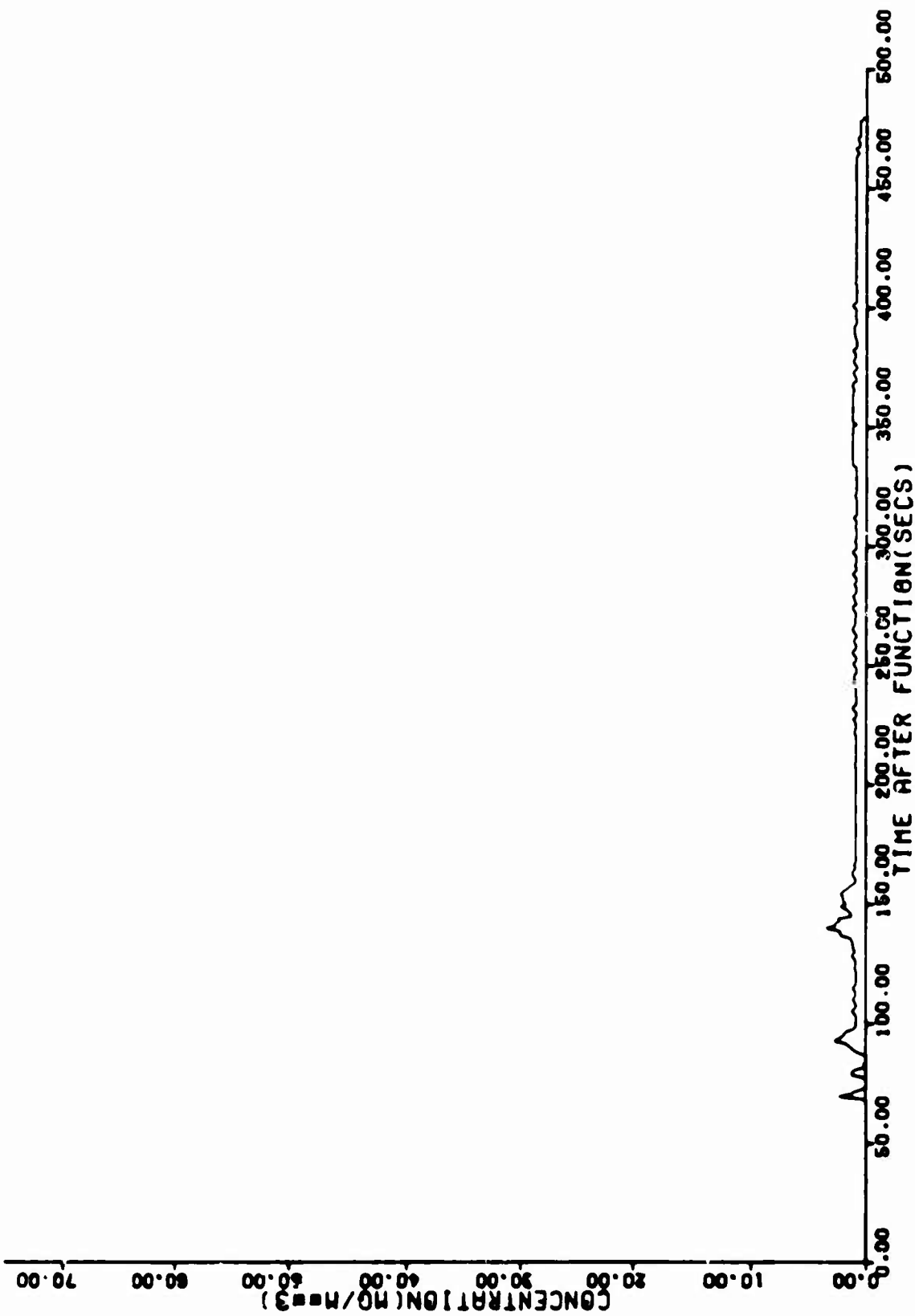
TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

PEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



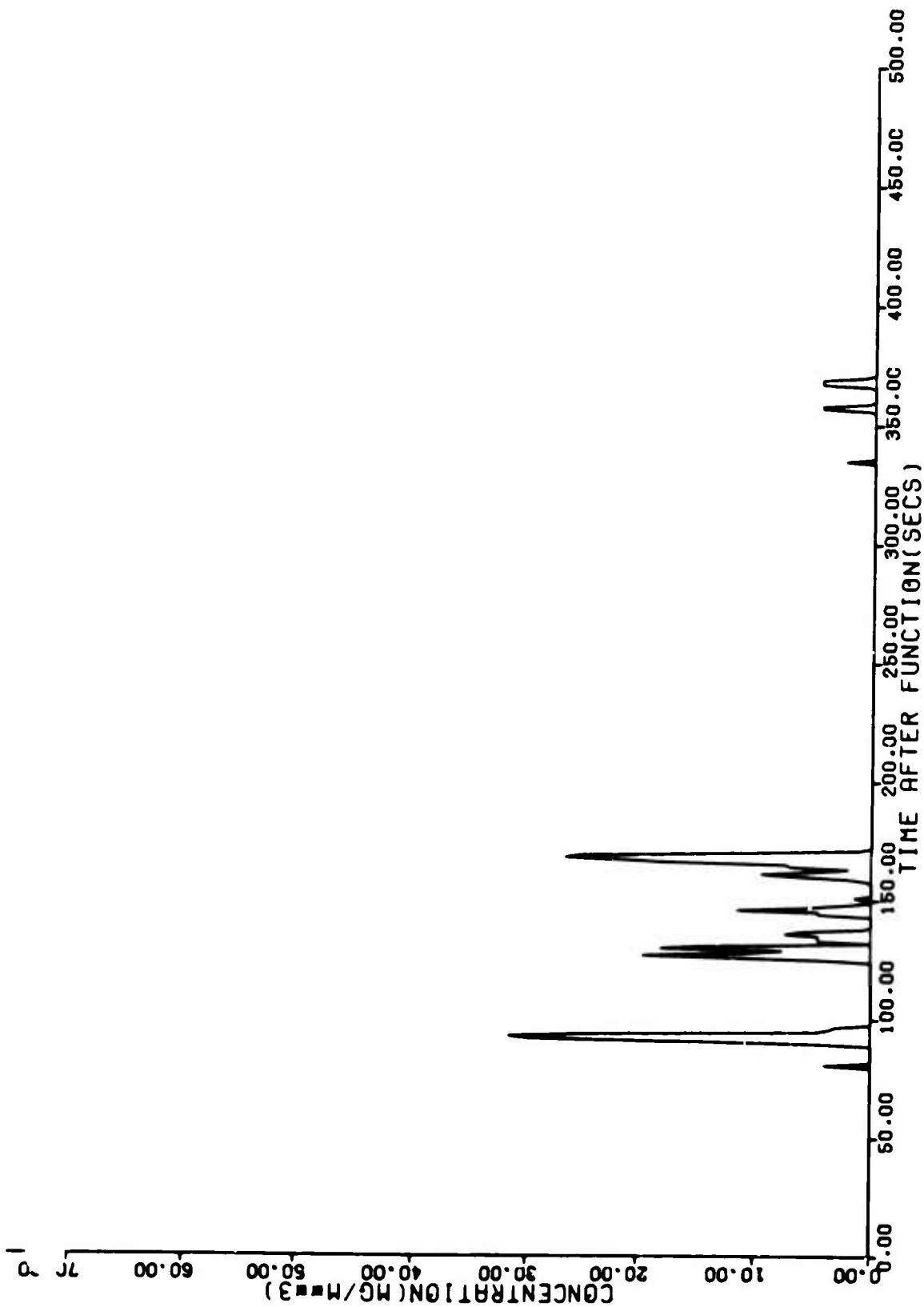
TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



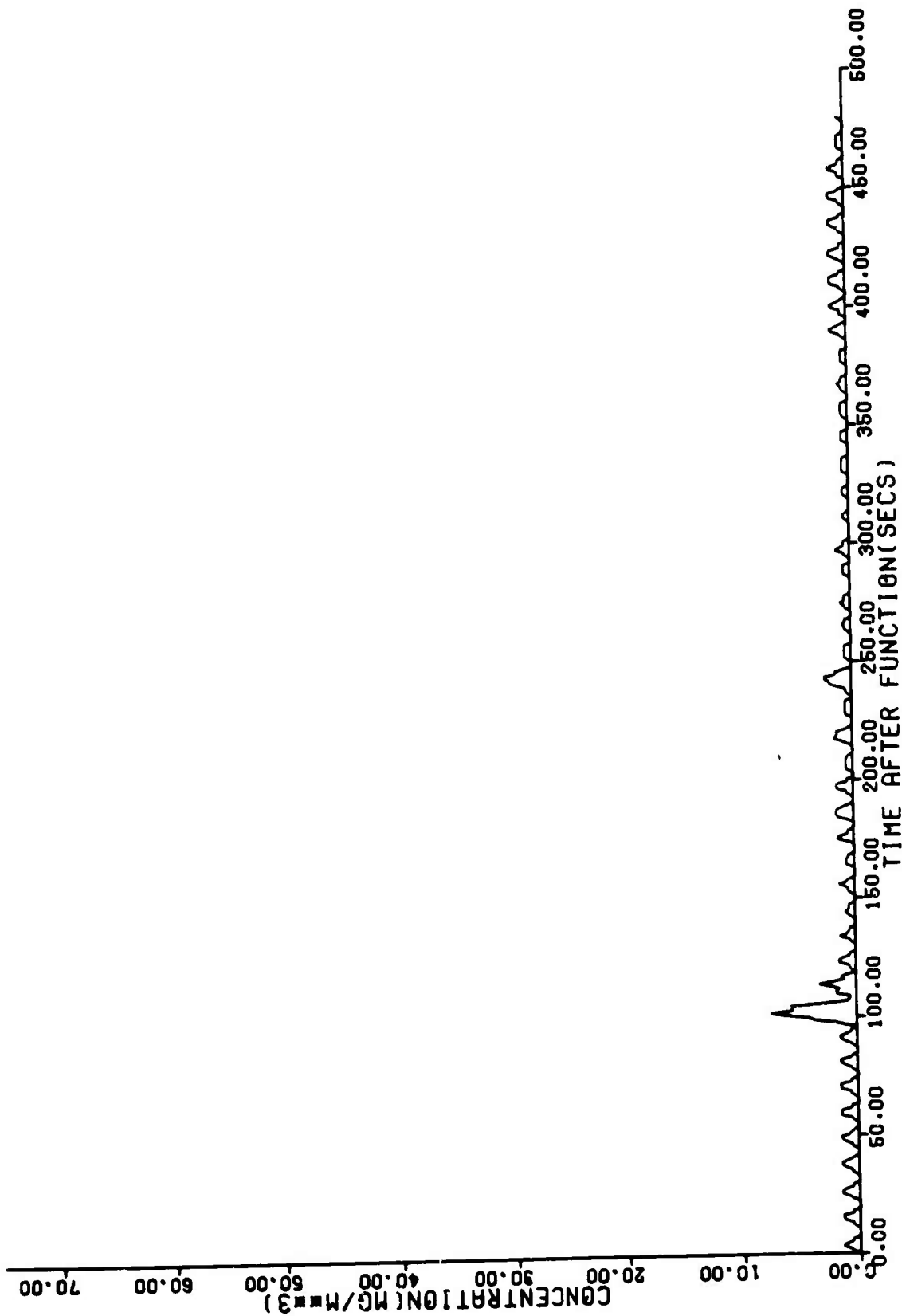
TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



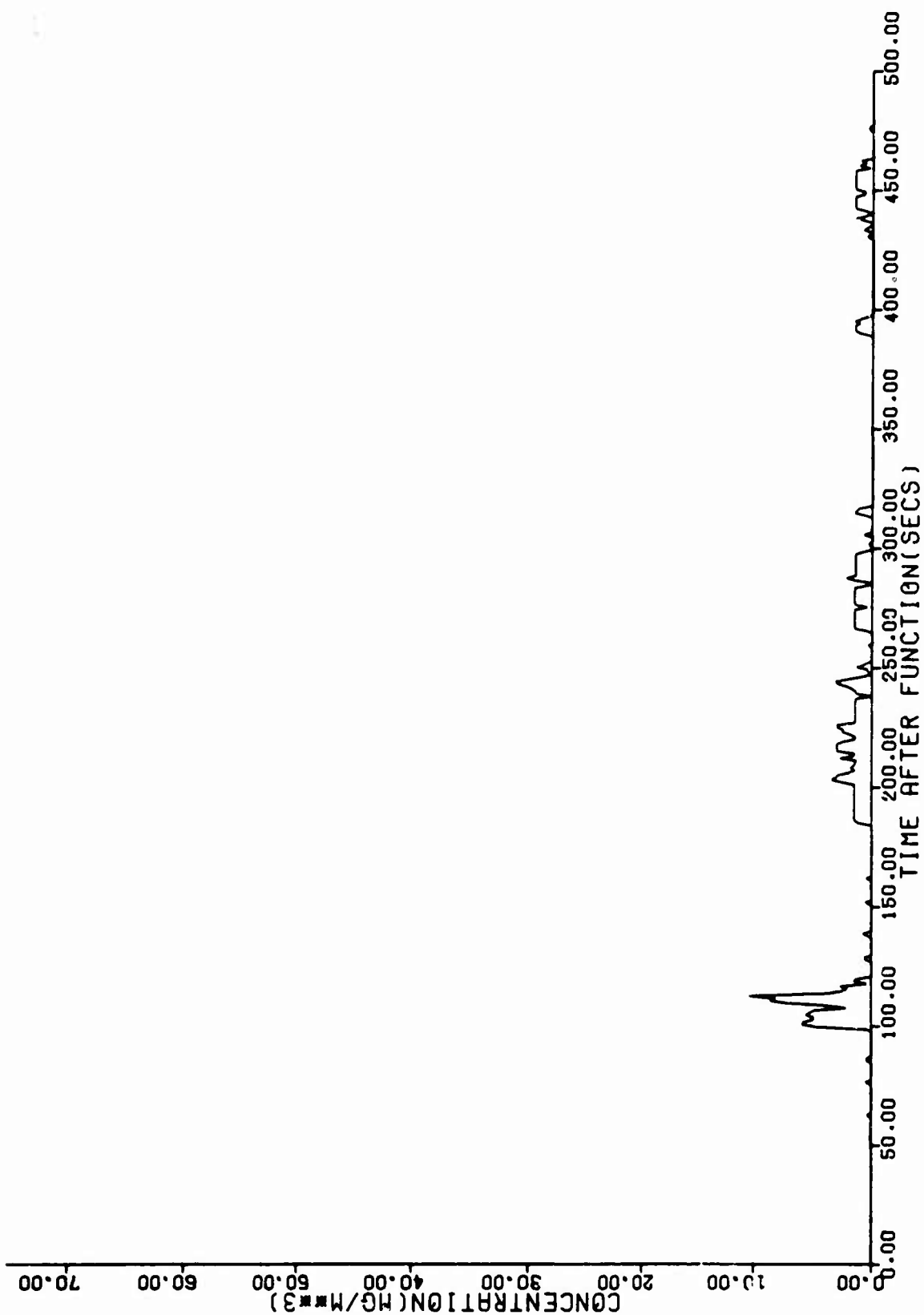
TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



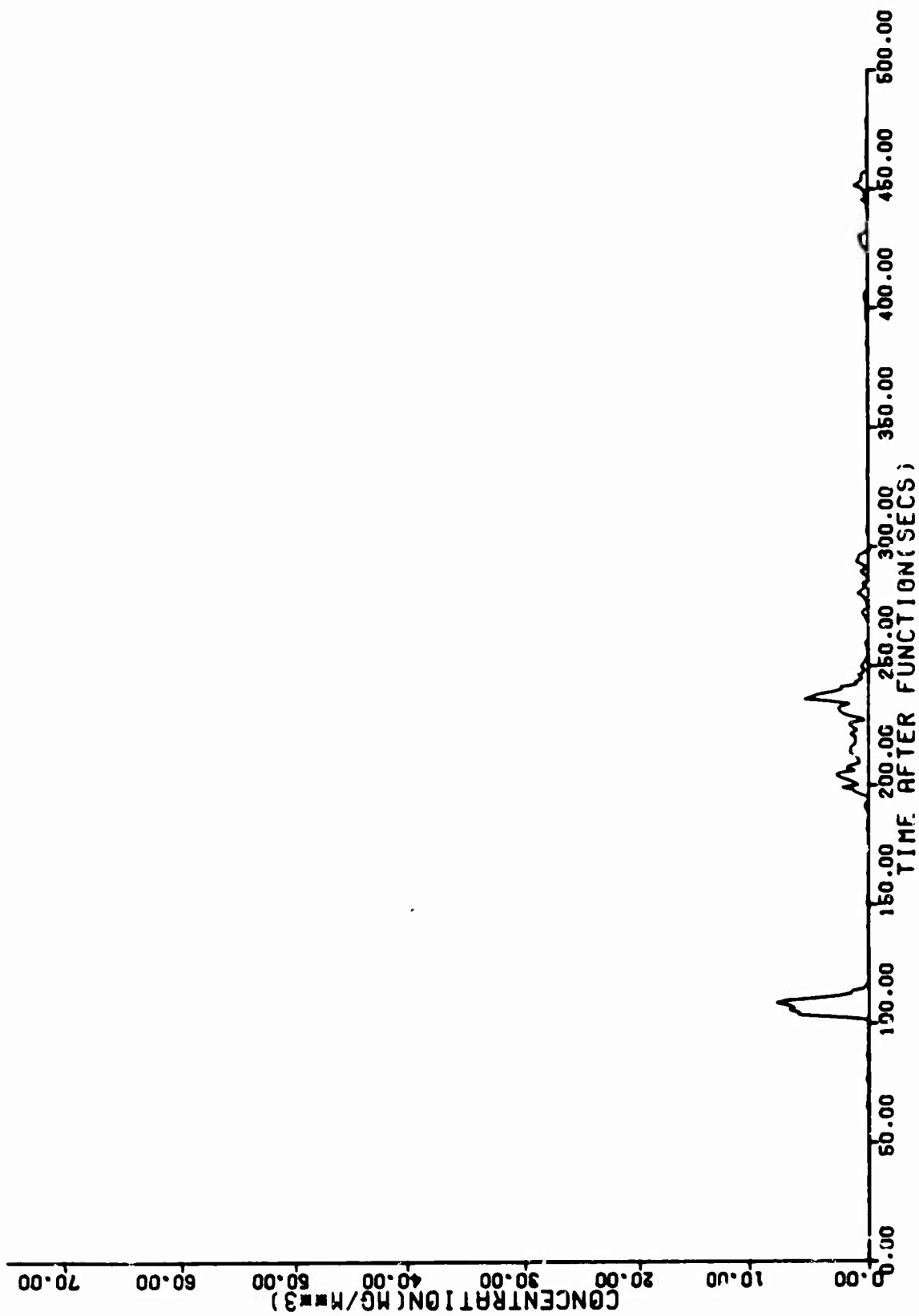
TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

AEROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

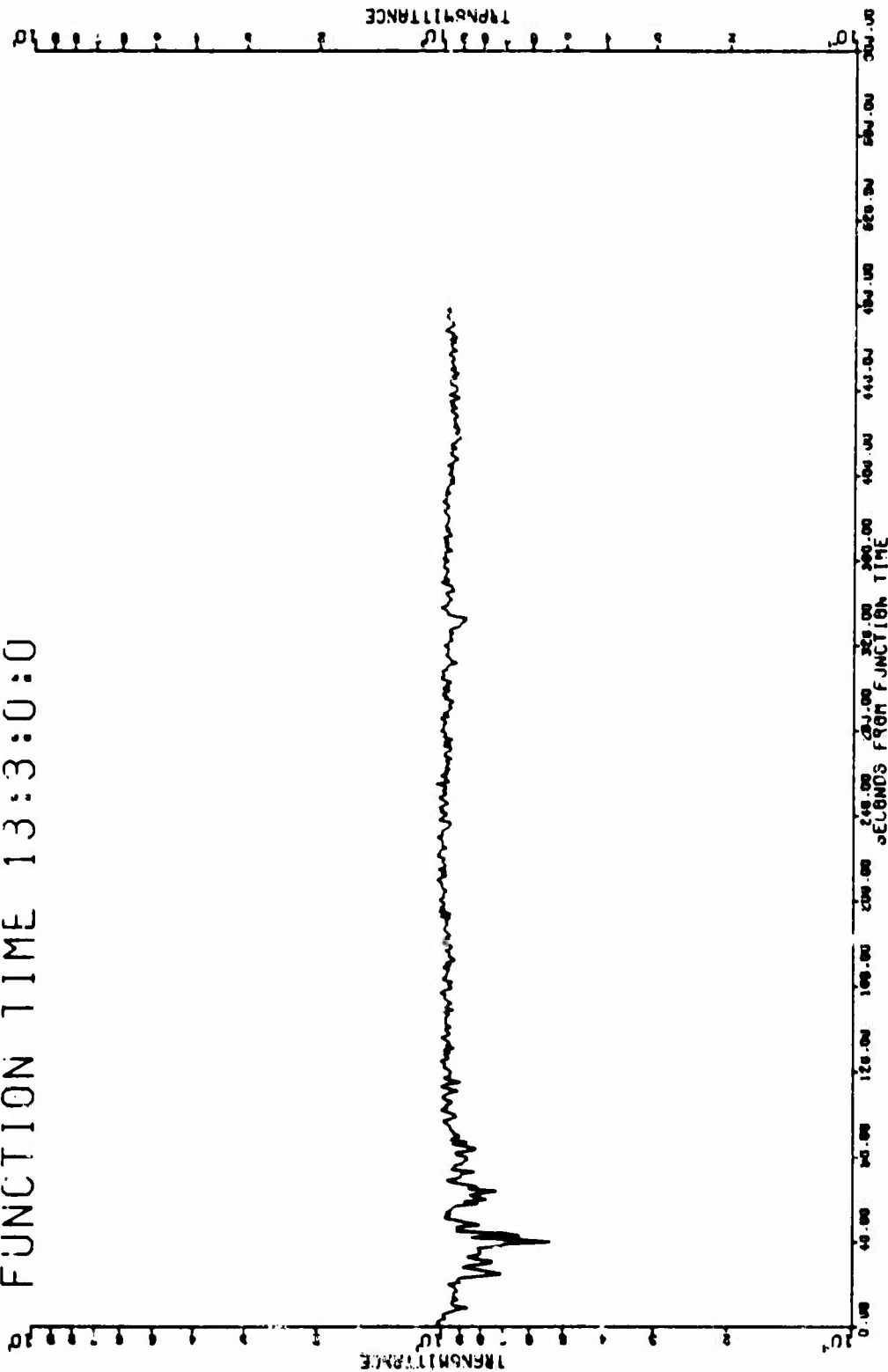
AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



TRIAL 9 (DP-1002), 23 SEP 1977, 13:03:00, WP SMOKE

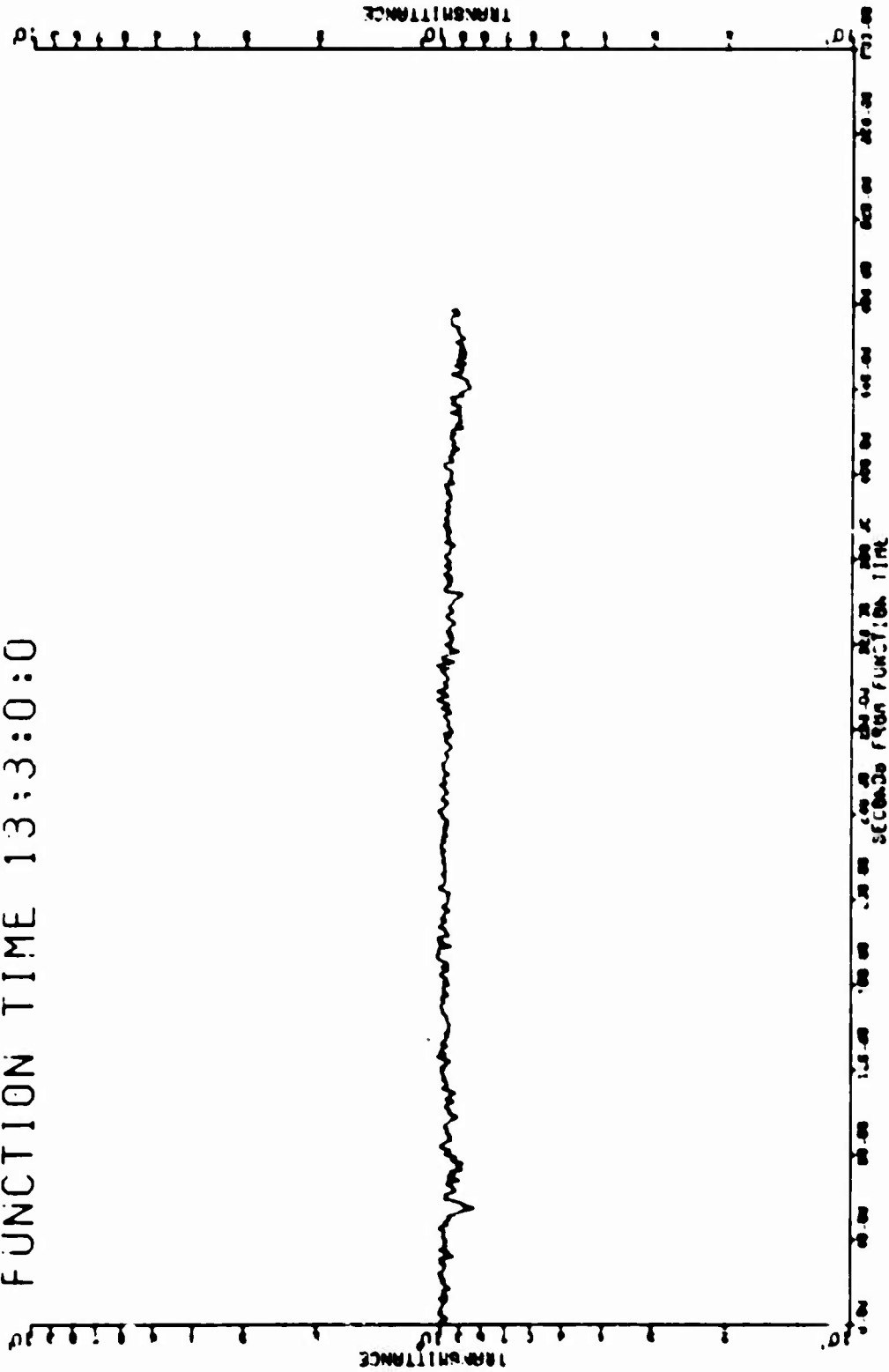
AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00

TRIAL #9 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:3:0:0



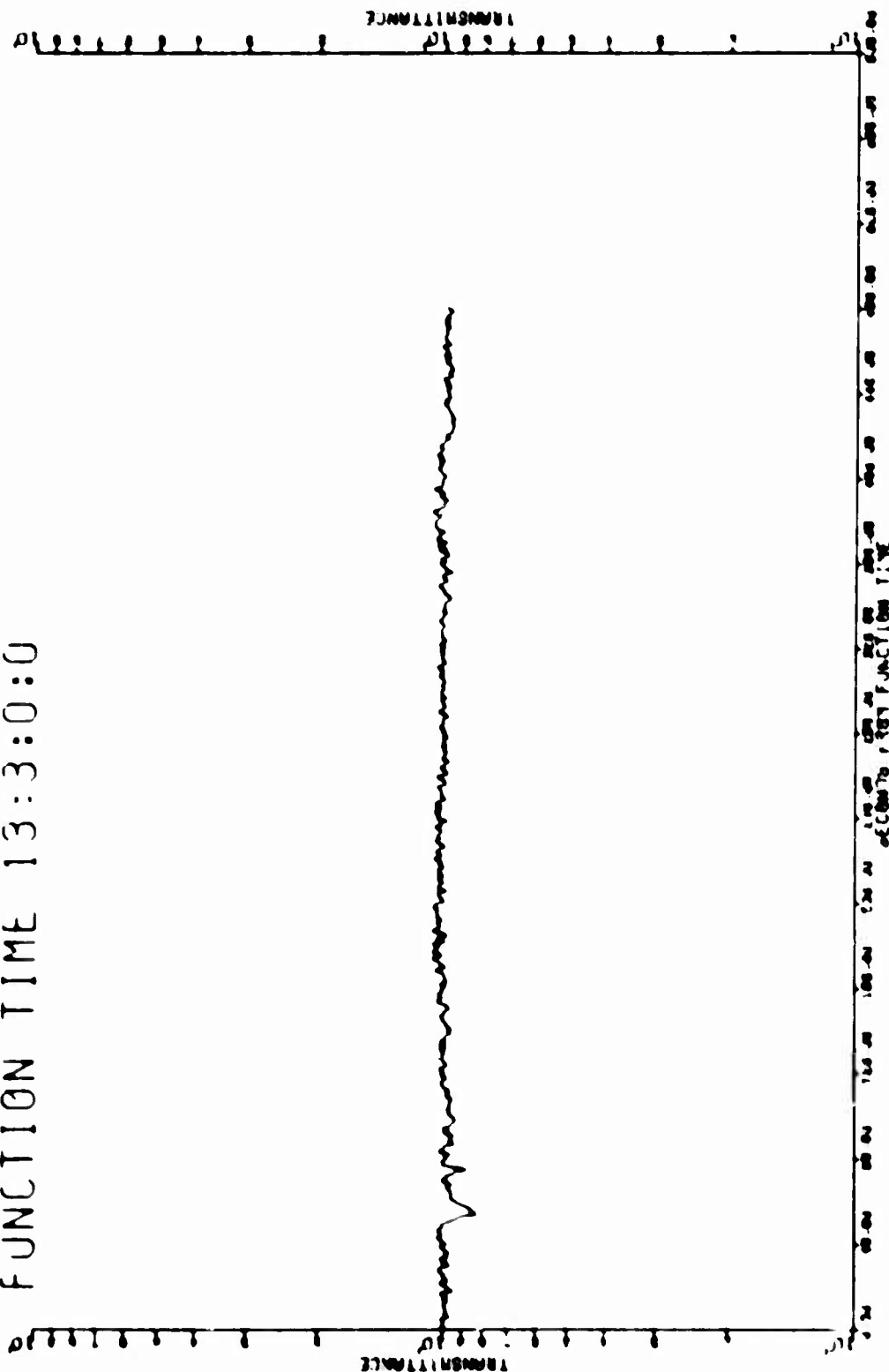
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #9 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:30:0



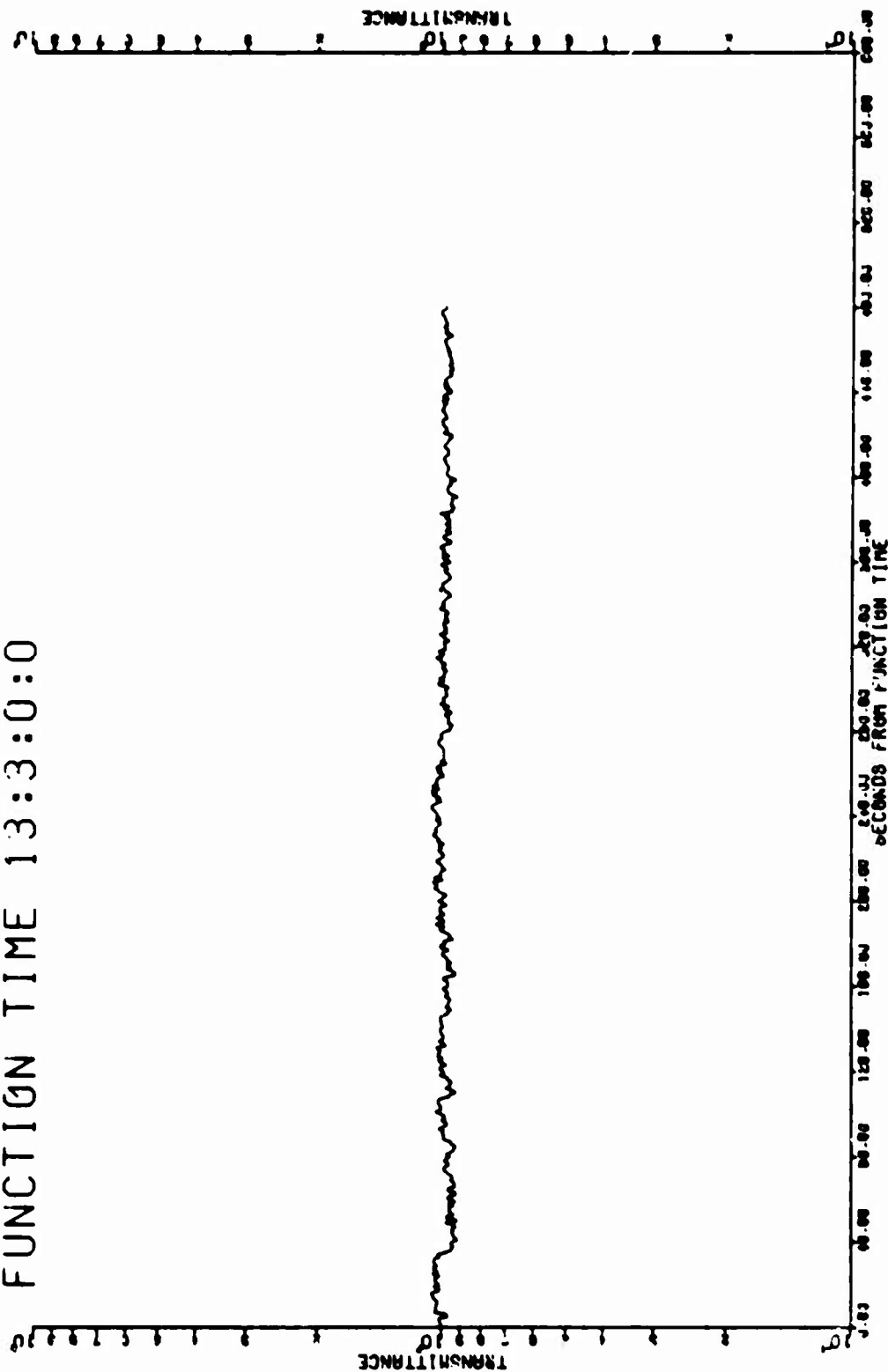
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON RGW 0

TRIAL #9 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:30:0



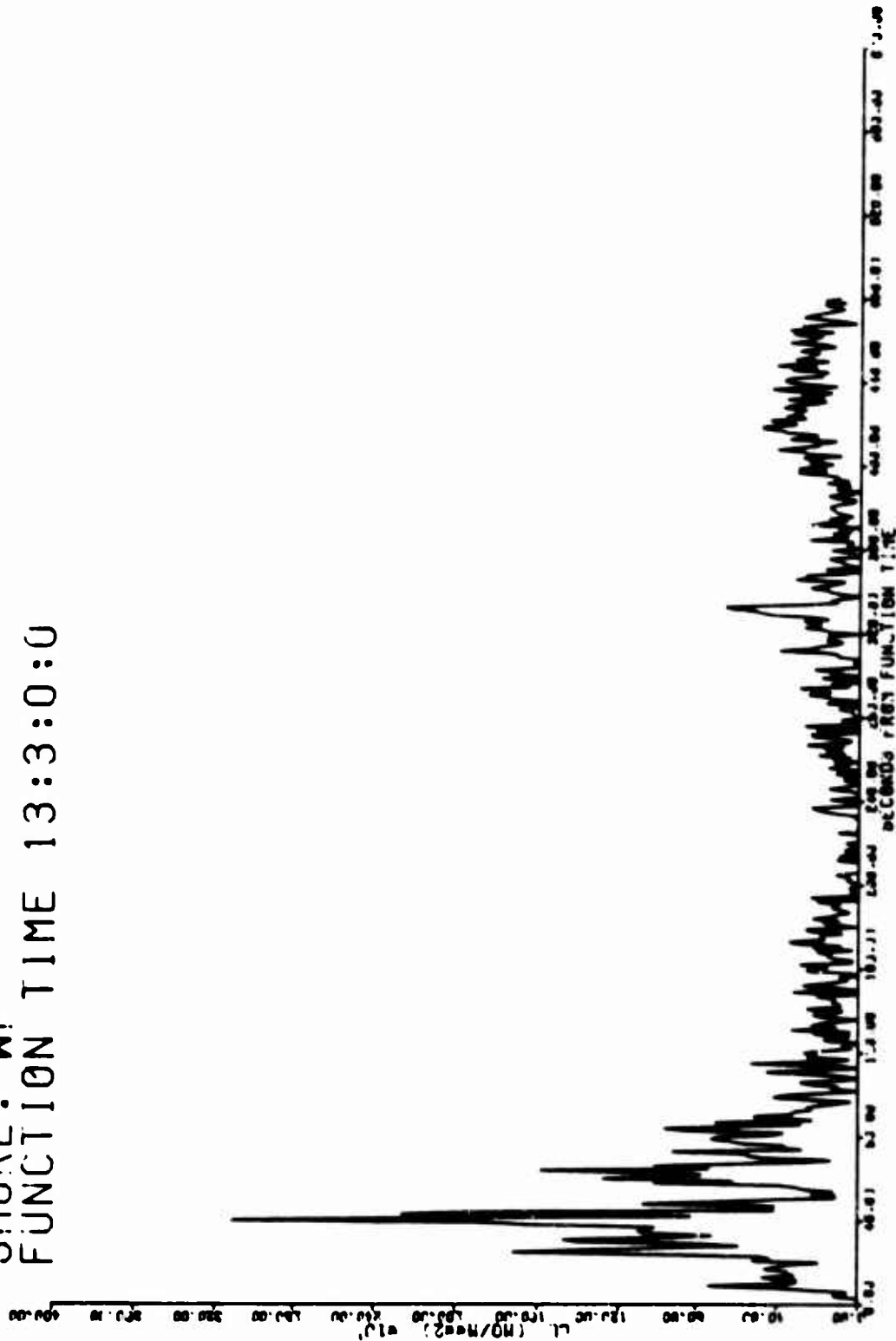
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 MICROMETER

TRIAL #9 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:30:0



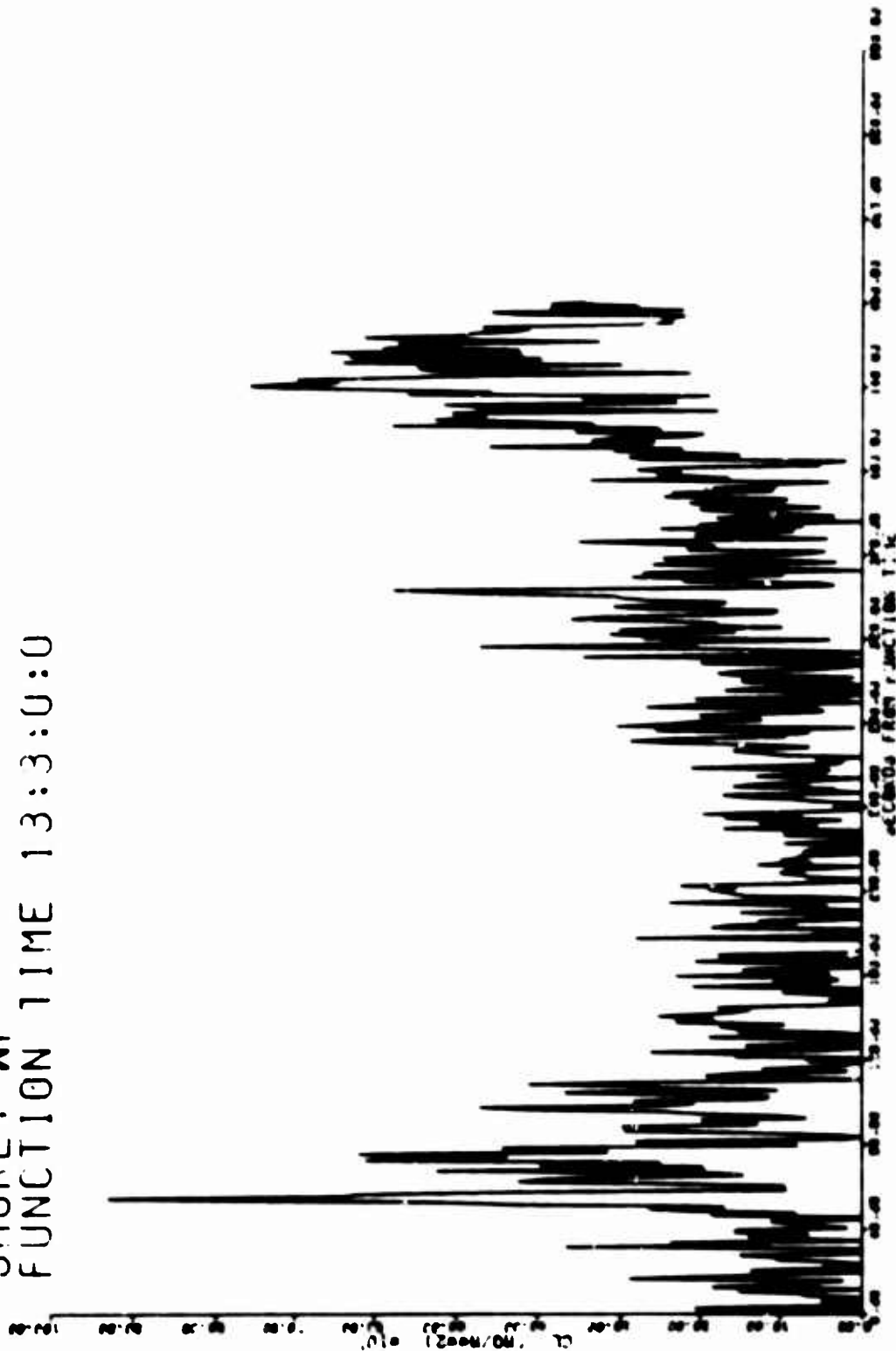
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #9 (CP1--002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:30:0



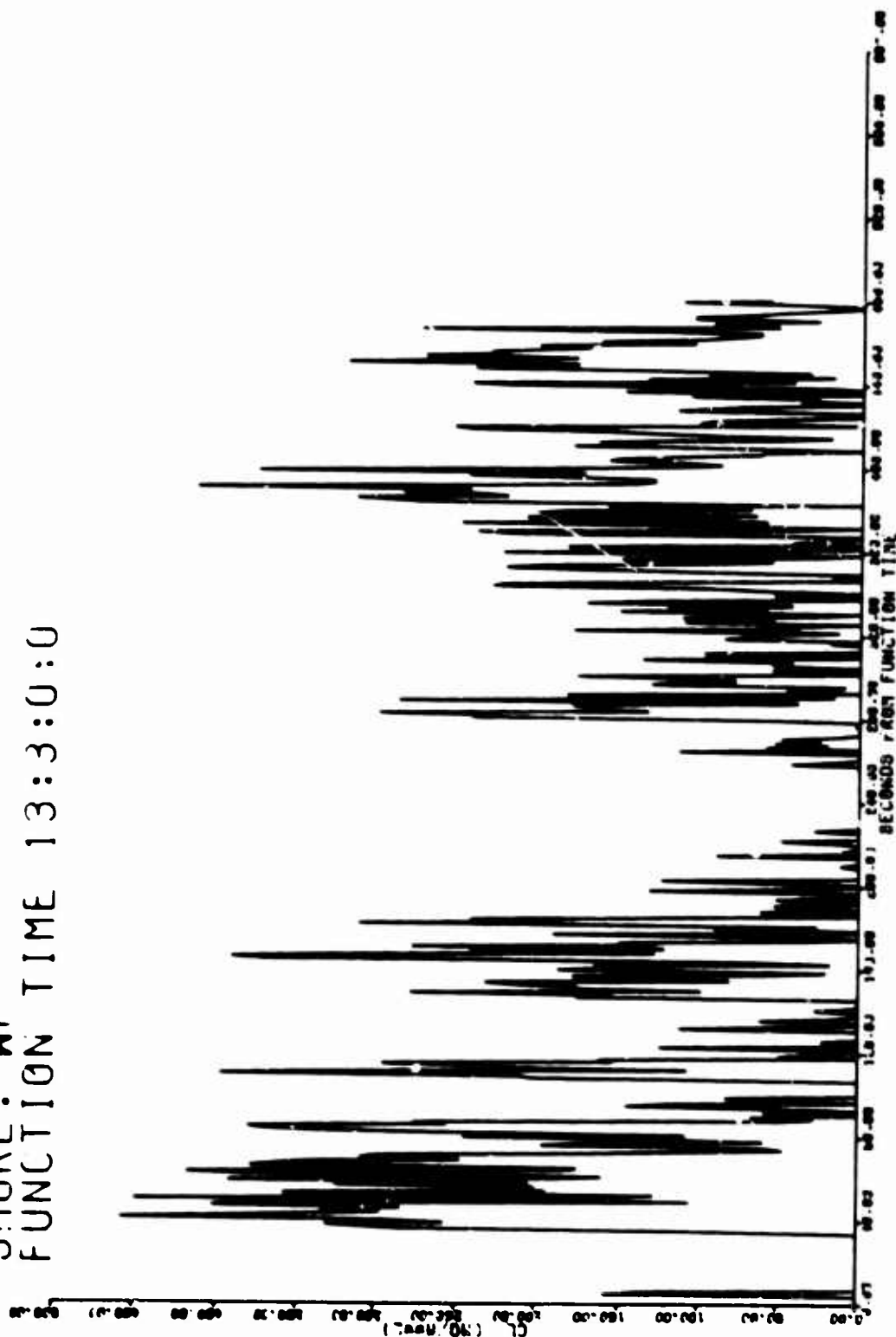
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #9 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:3:0:0



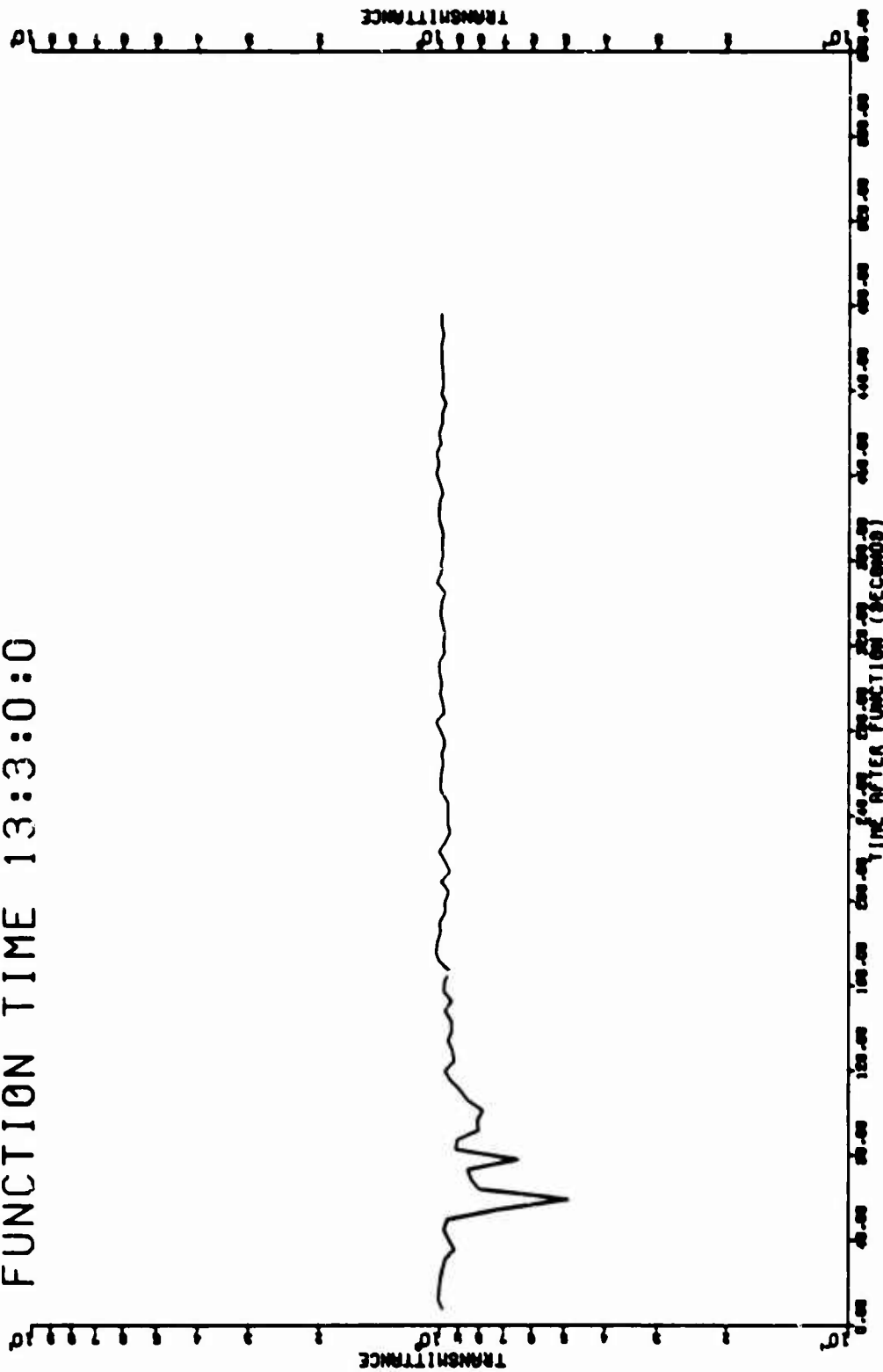
LL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #9 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:30:0



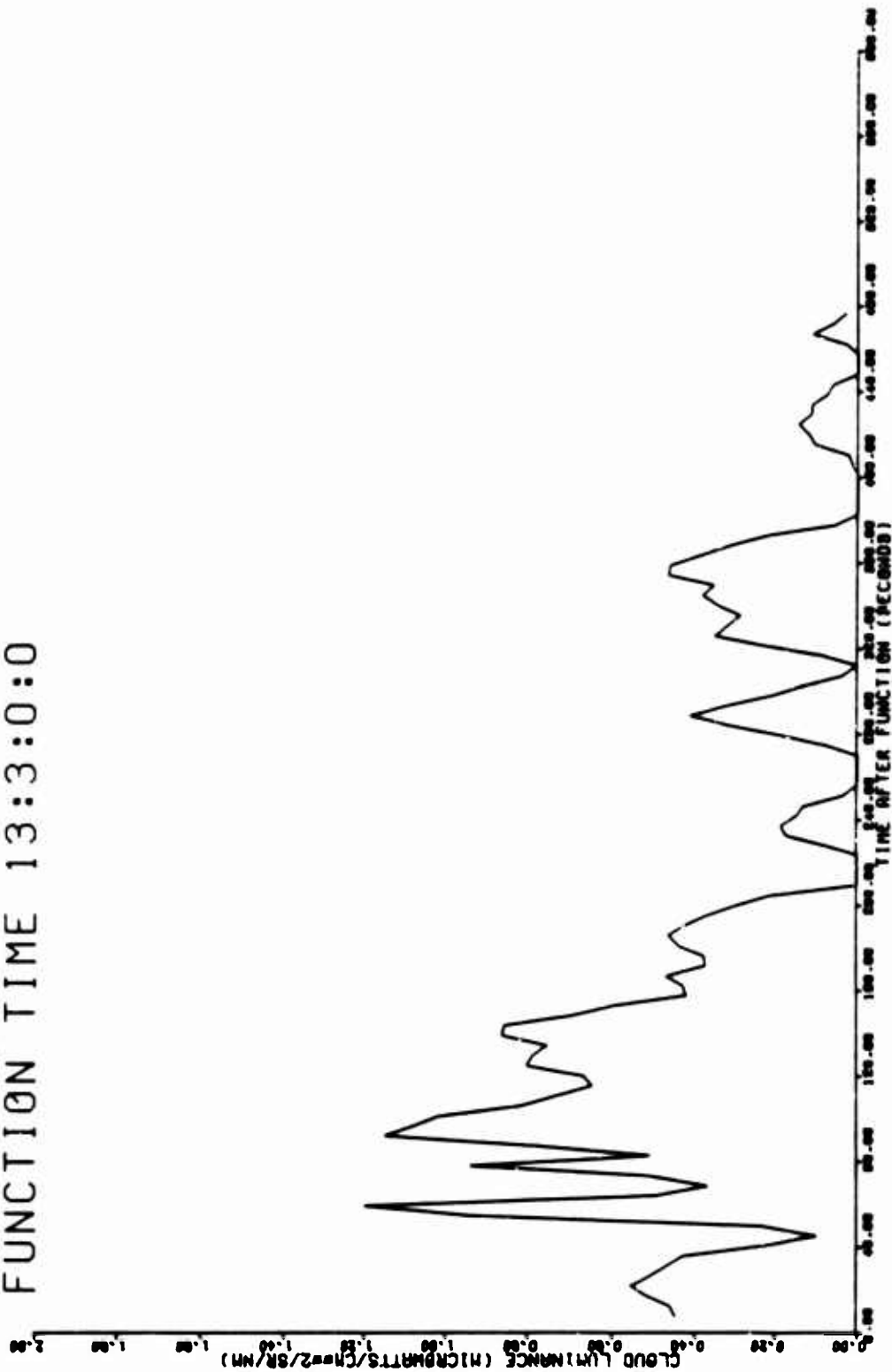
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #9 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:30:0



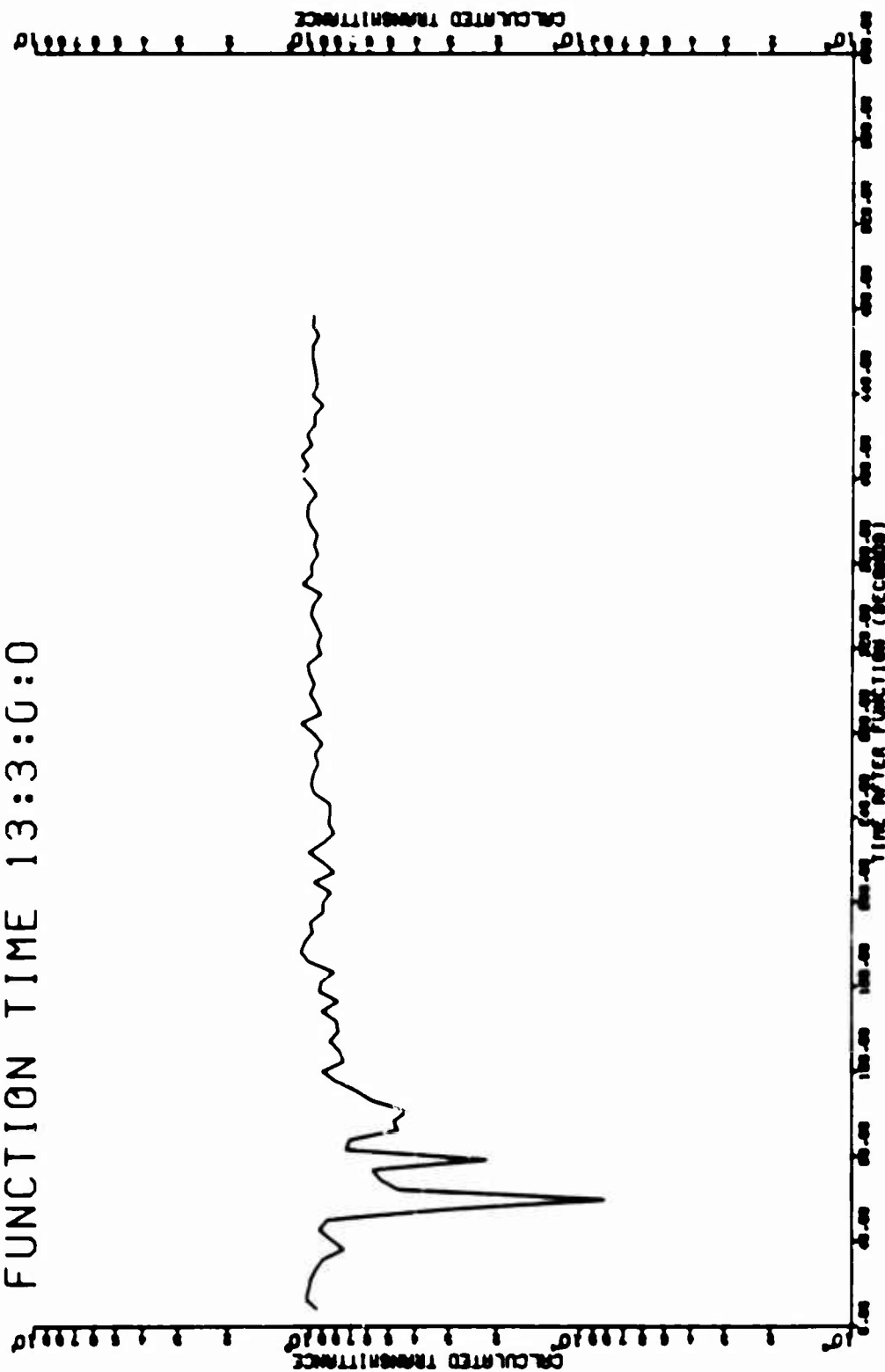
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #9 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:30:0



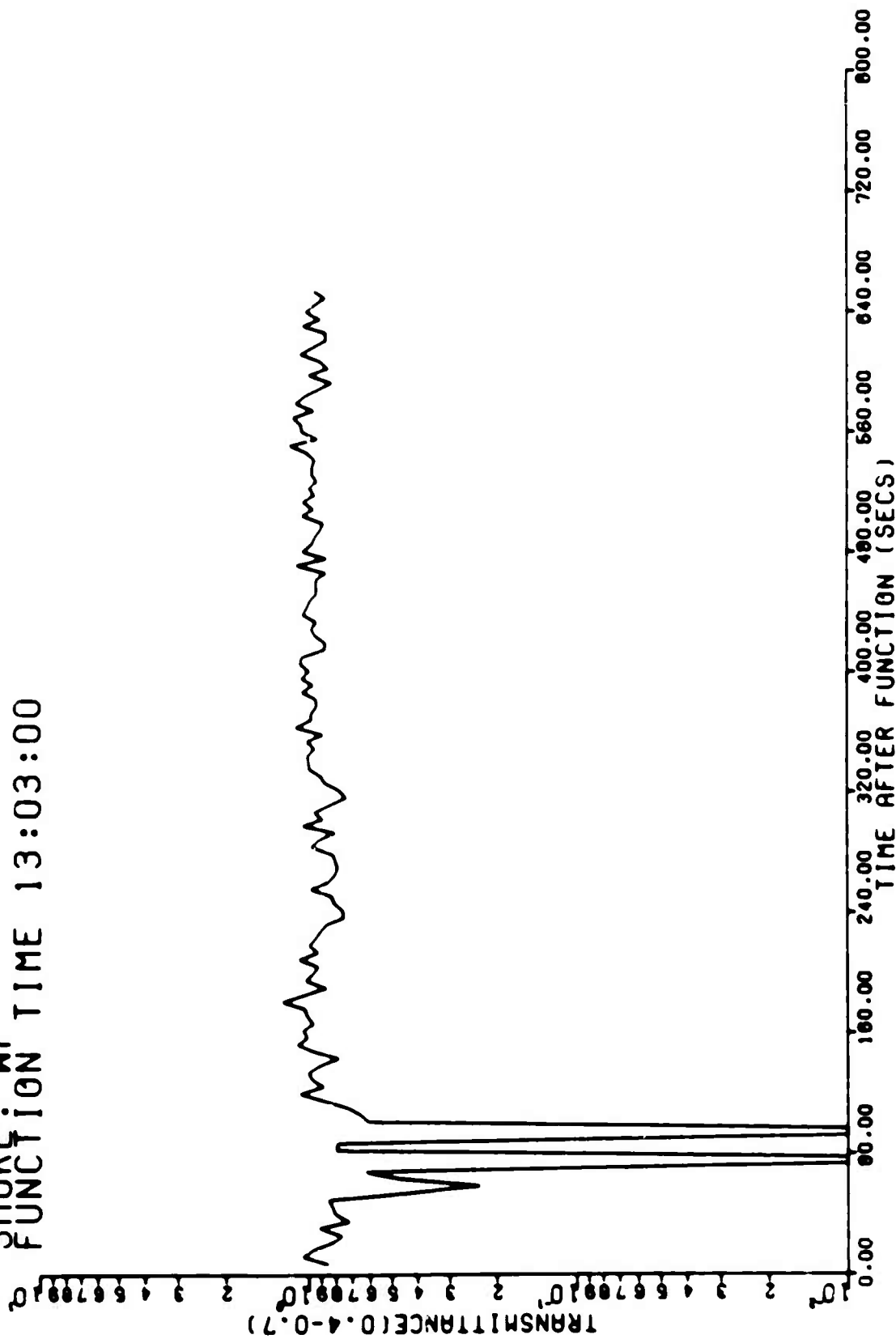
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #9 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:30:0



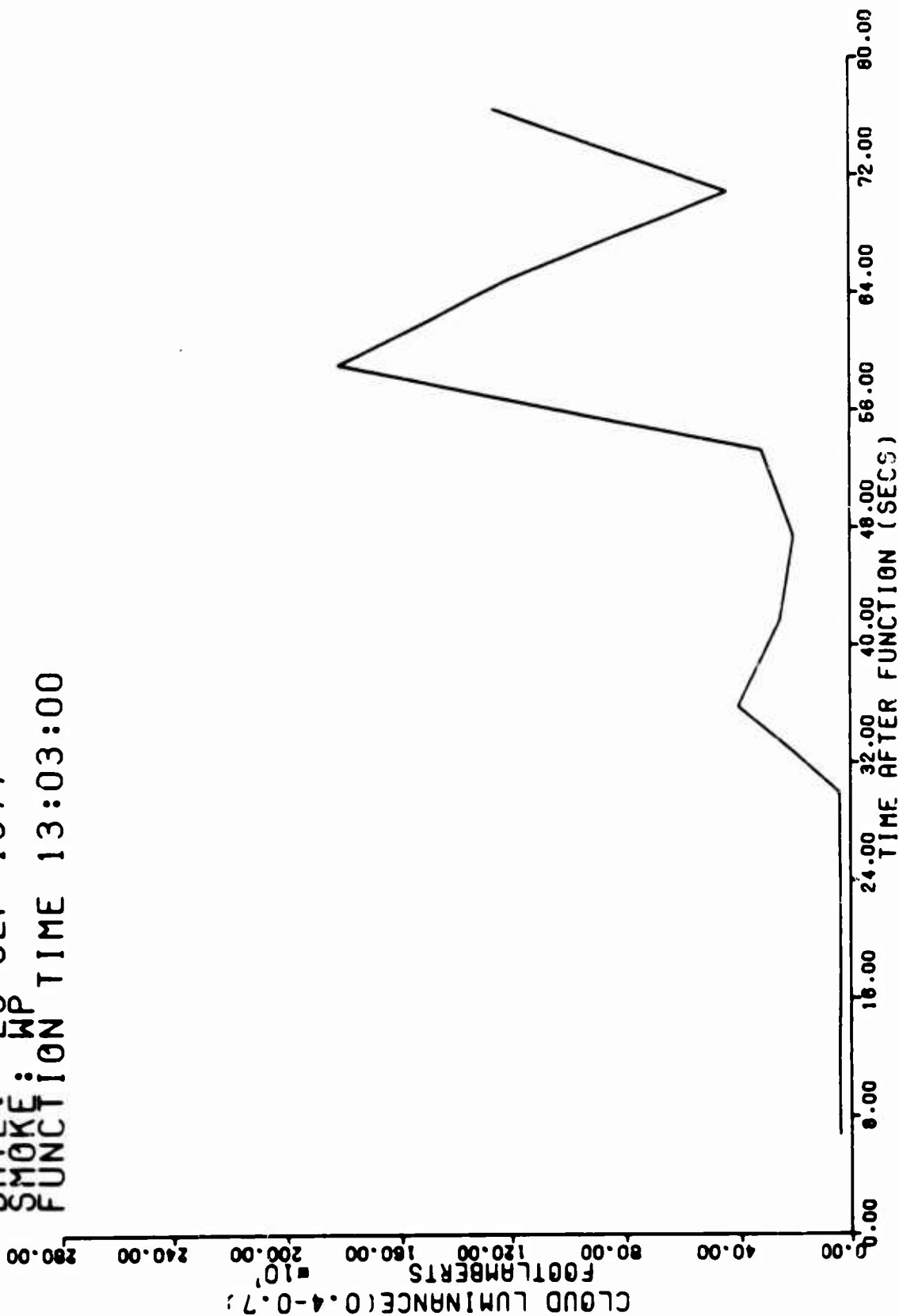
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 9 (DP-1002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:03:00



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW Q

TRIAL 9 (DP-1002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:03:00



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

APPENDIX B-I-8

TRIAL DPI-002-T-10 (WP SMOKE) 6 OCT 1977

SUMMARY OF TEST DATA	B-I-8-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-8-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-8-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-8-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-8-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-8-16
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-8-17
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-8-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-8-19
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-8-20
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-8-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-8-22
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-8-23
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-8-24
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-8-25

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 B-I-8-26

FIGURE: PARTICLE SIZE DISTRIBUTION B-I-8-27

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME B-I-8-28

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME B-I-8-29

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #10

Date: 06 Oct 77

Time: 1217 MDT

Wind Direction (Transport) (degrees) (4m)	290
Mean Wind Speed (Transport) (\bar{u} , m/sec)	7.9
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	8.0
Temperature at 2-meters, Trial Time (T, °C)	17.5
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	3.5
Temperature Gradient, 0.5-8m (ΔT , °C)	-0.9
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.23
Pasquill Stability Category	D
Relative Humidity (percent) (2m)	52.0
Solar Azimuth (deg)	157.7
Solar Altitude (deg)	42.2
Air Density - ρ (kg m ⁻³)	1.042
Solar Radiation (Langleys per minute)	0.482
Barometric Pressure (millibars)	866.9
Visibility (km)	64
Reflectivity, OD Target	0.21
Haze (footlamberts)	23
Brightness, Background (footlamberts)	800
Brightness, White Target (footlamberts)	1156
Brightness, UD Target	260
Percent Opaque Cloud Cover	7

Munitions/Submunitions Used (WP, 4.2 inch)	4
Number of Munitions/Submunitions Functioned	4
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.44
(0.4 - 0.6) . . . . .	.32
(0.6 - 0.8) . . . . .	.14
(0.8 - 1.0) . . . . .	.06
(1.0 - 1.5) . . . . .	.01
(1.5 - 3.0) . . . . .	.00
$\log_{10} \text{NMD}$	-.36709
$\sigma \log_{10} \text{NMD}$ . . . . .	.20635
NMD . . . . .	.43
MMD . . . . .	.54

Initial Cloud Dimensions (Meters)

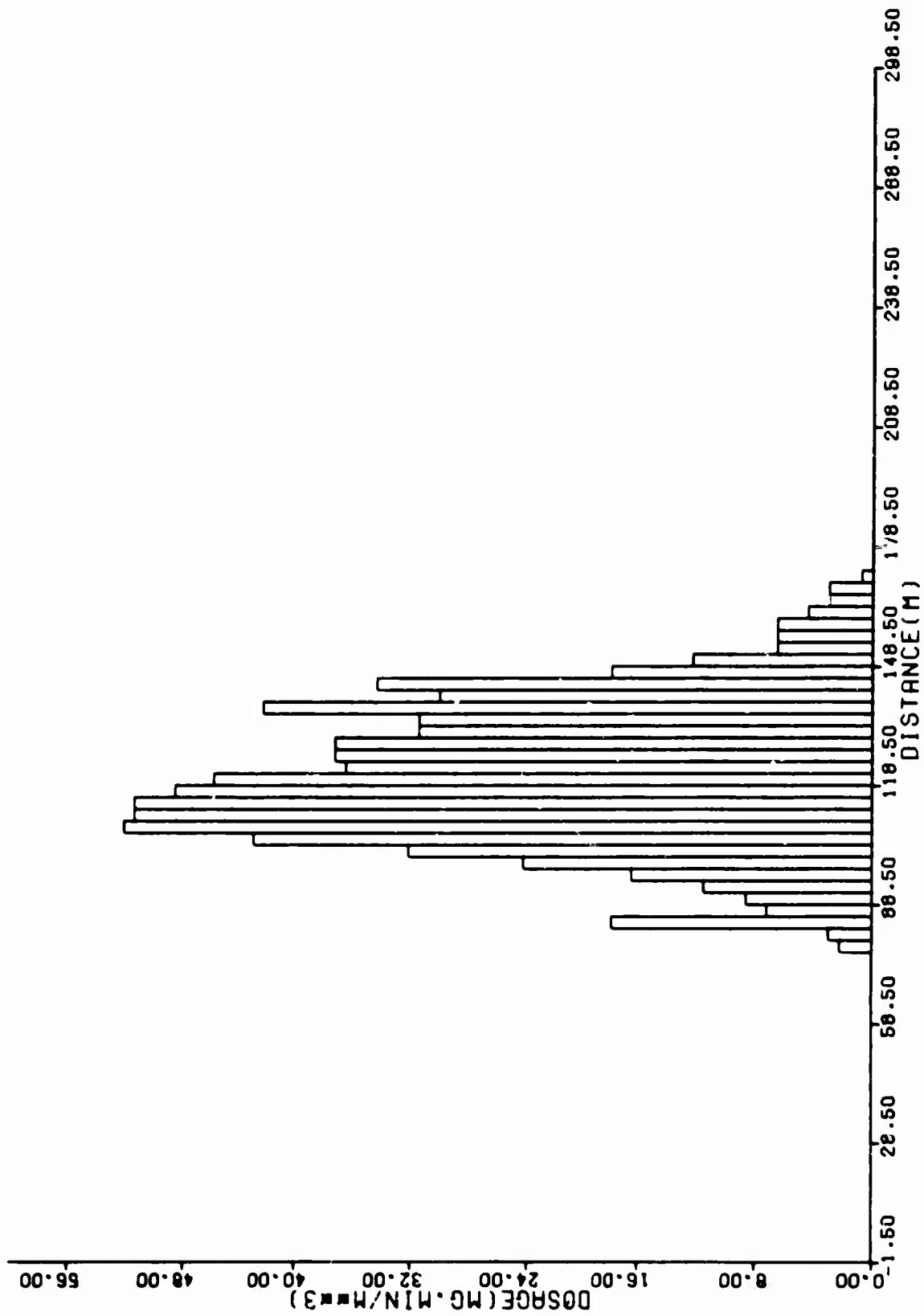
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1217:00	4	19	4
1217:10	85	44	20
1217:20	96	48	20
1217:30	99	61	24
1217:40	123	61	24
1217:50	125	61	24
1218:00	143	63	24
1218:10	144	65	26

SKY BRIGHTNESS

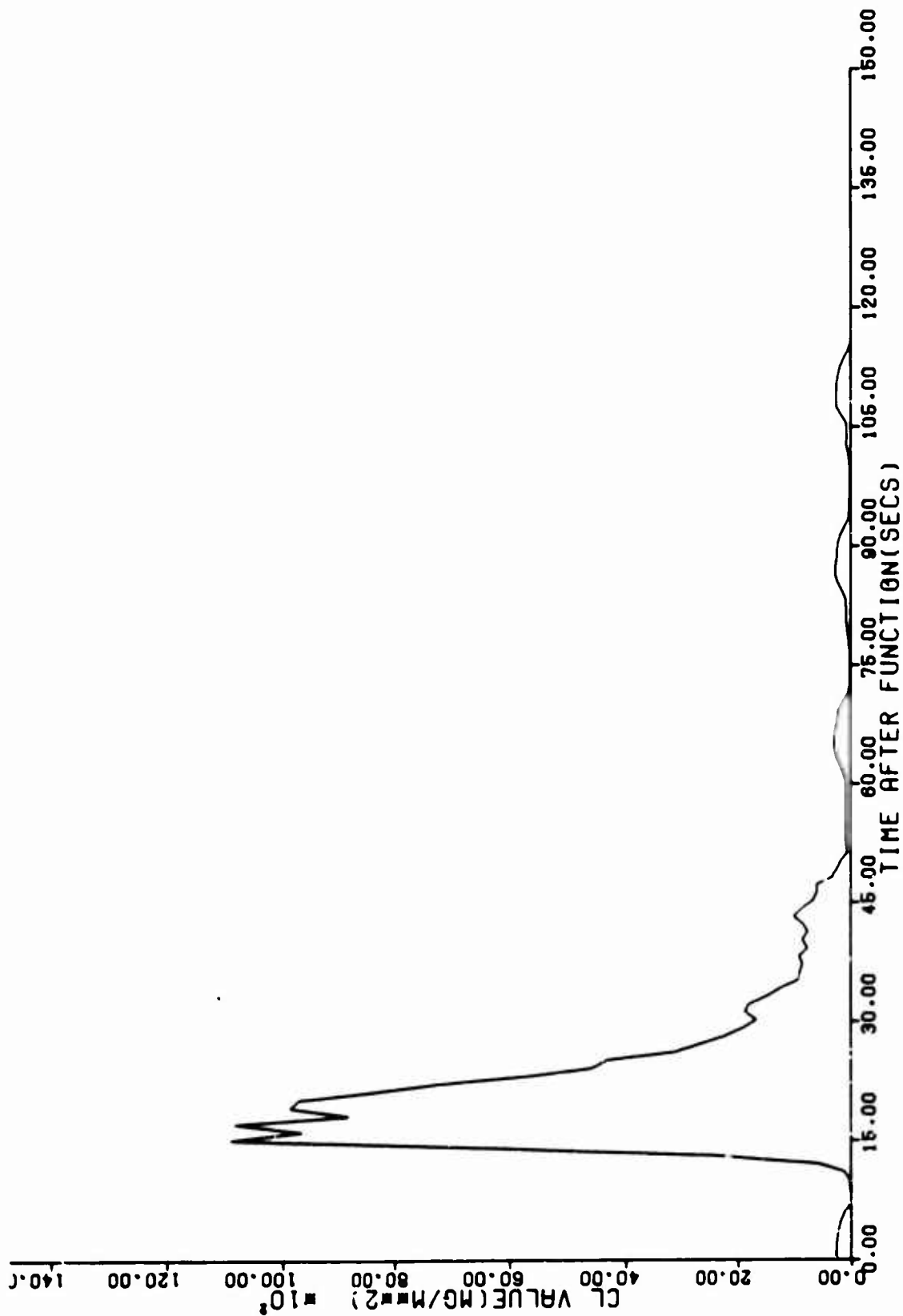
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	ND
5	ND
10	ND
15	ND
20	ND
25	ND
30	ND
35	ND
40	ND
45	ND

Viewing azimuth 240° except 255° at 0 degrees elevation

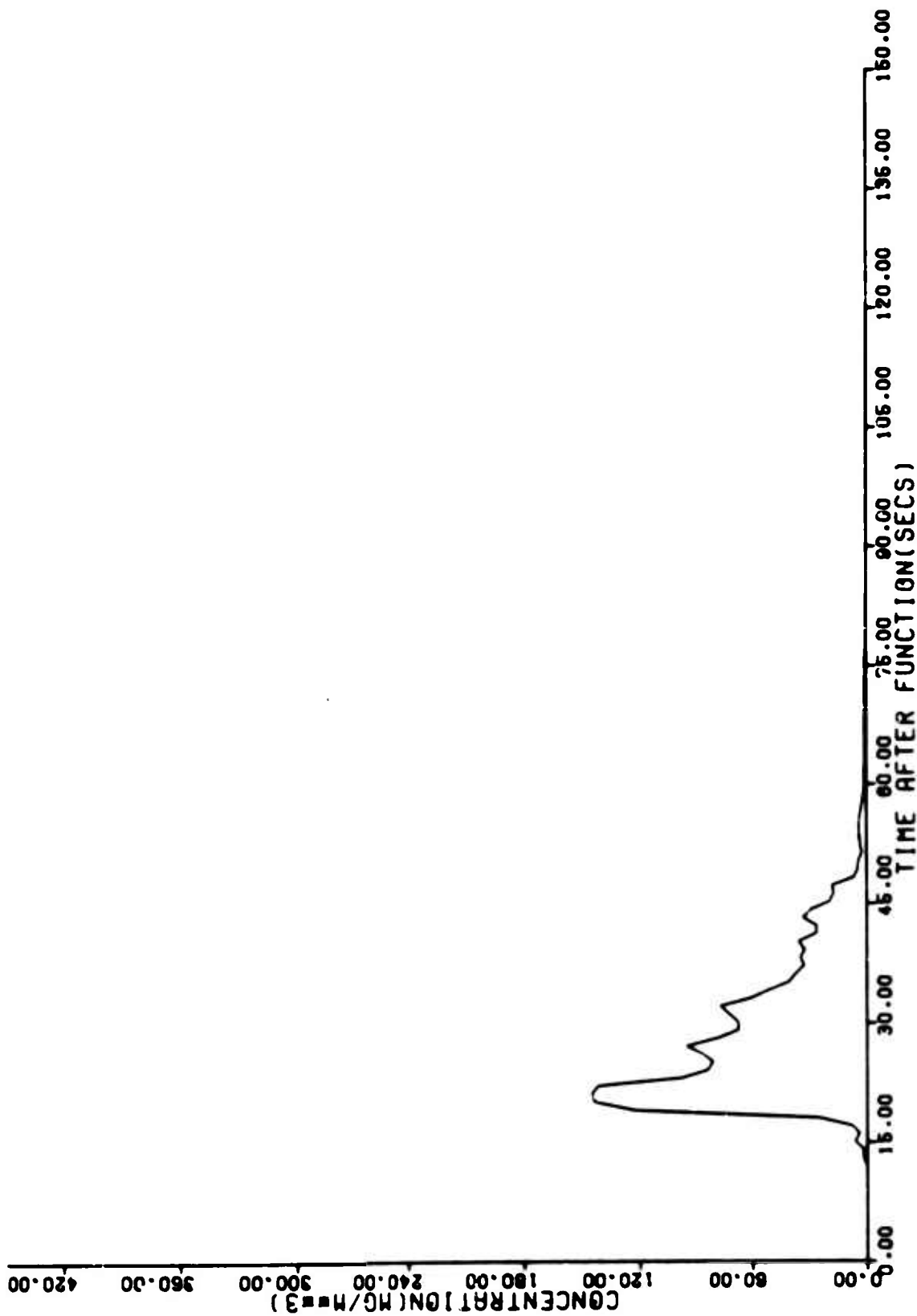


TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMO, I



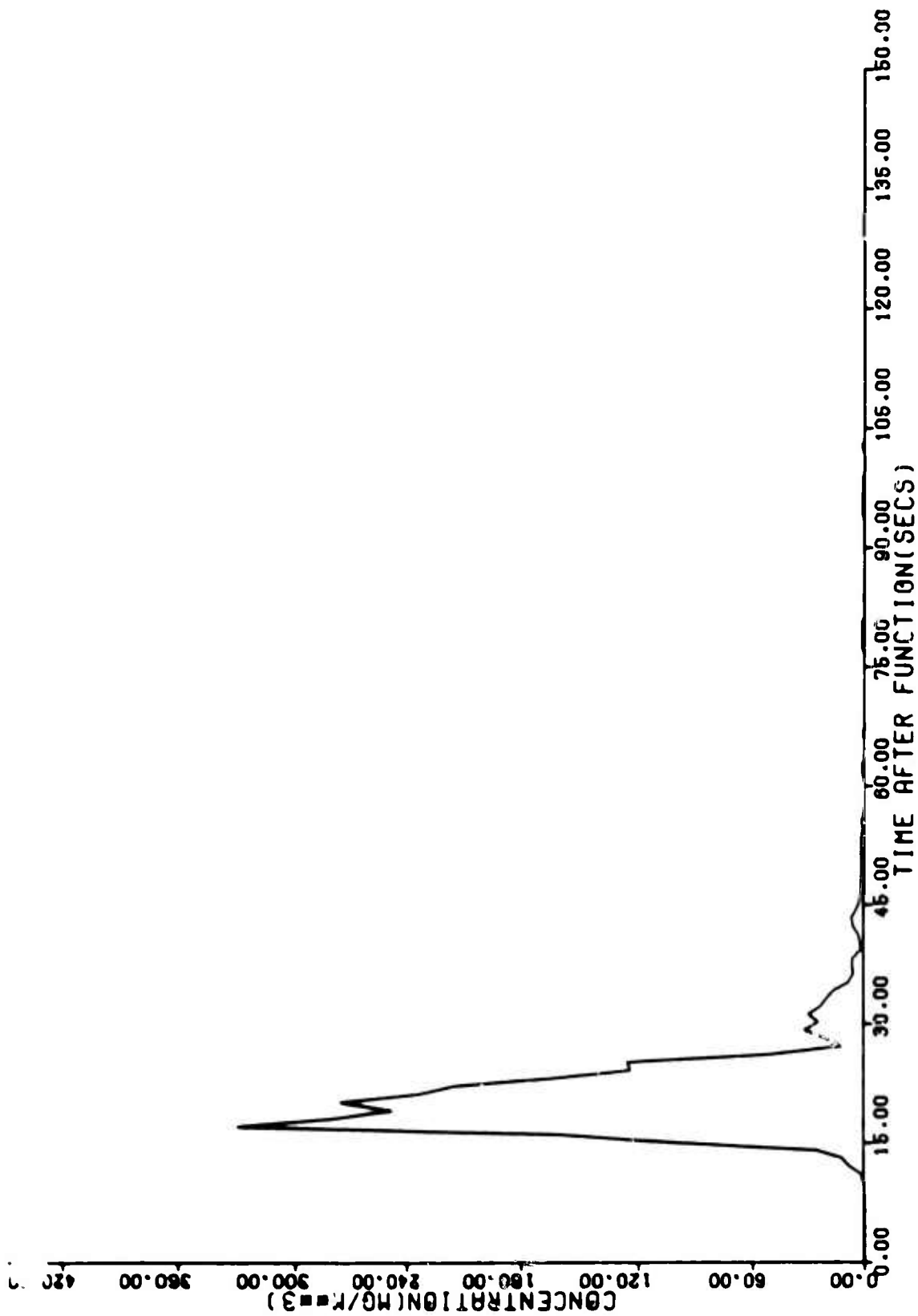
TRIAL 10 (DP-1002). 6 OCT 1977, 12:17:00. WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



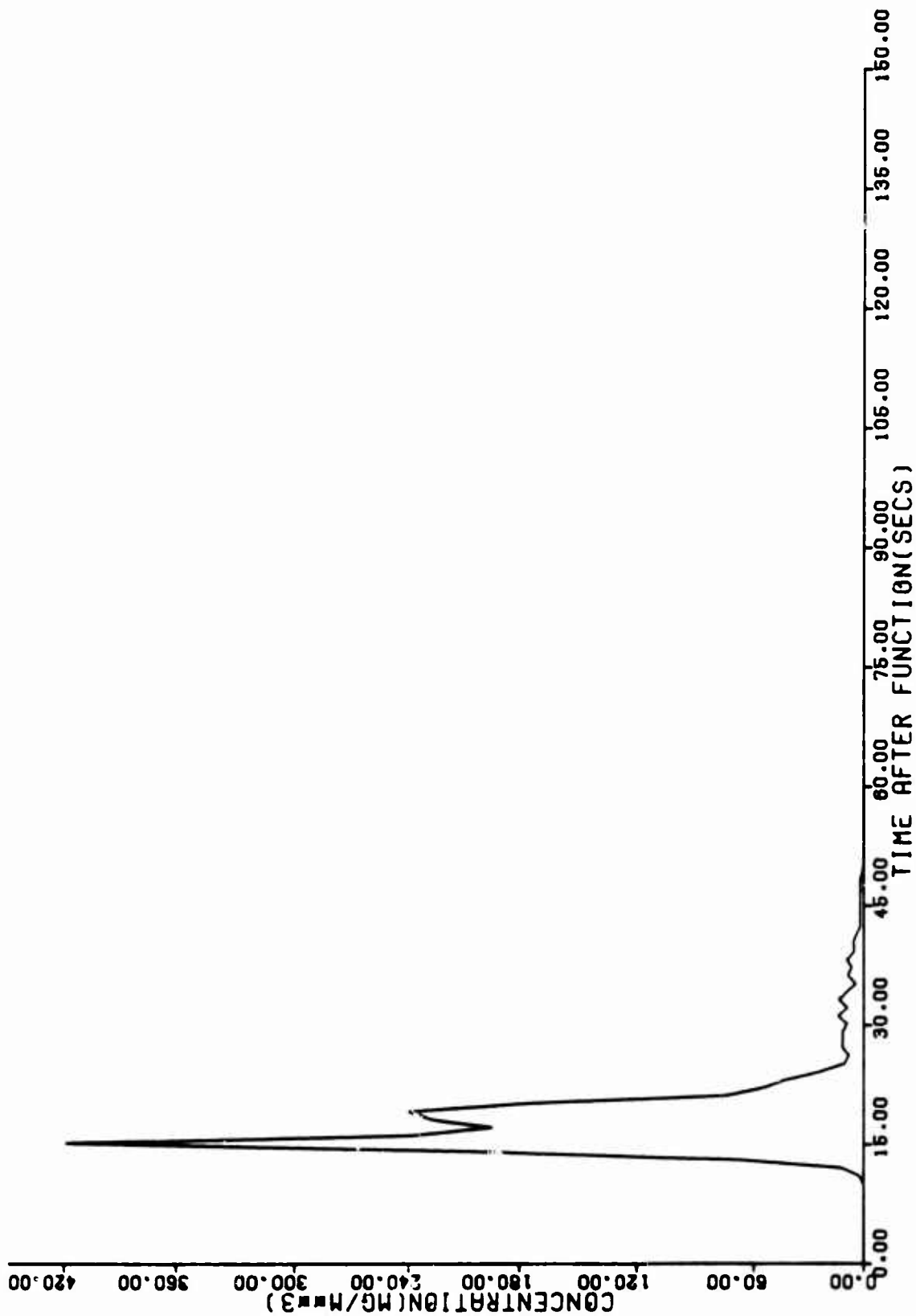
TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



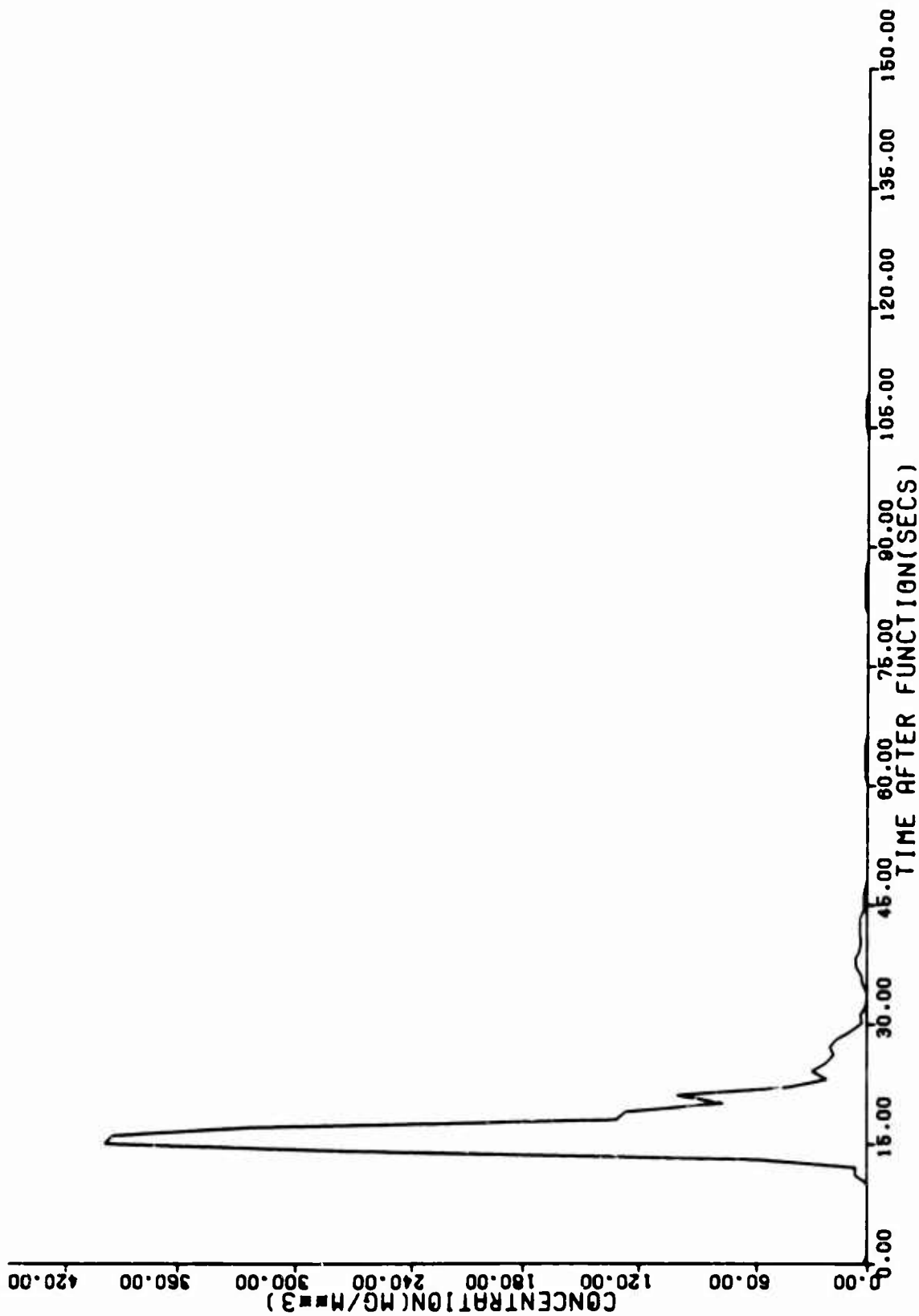
TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



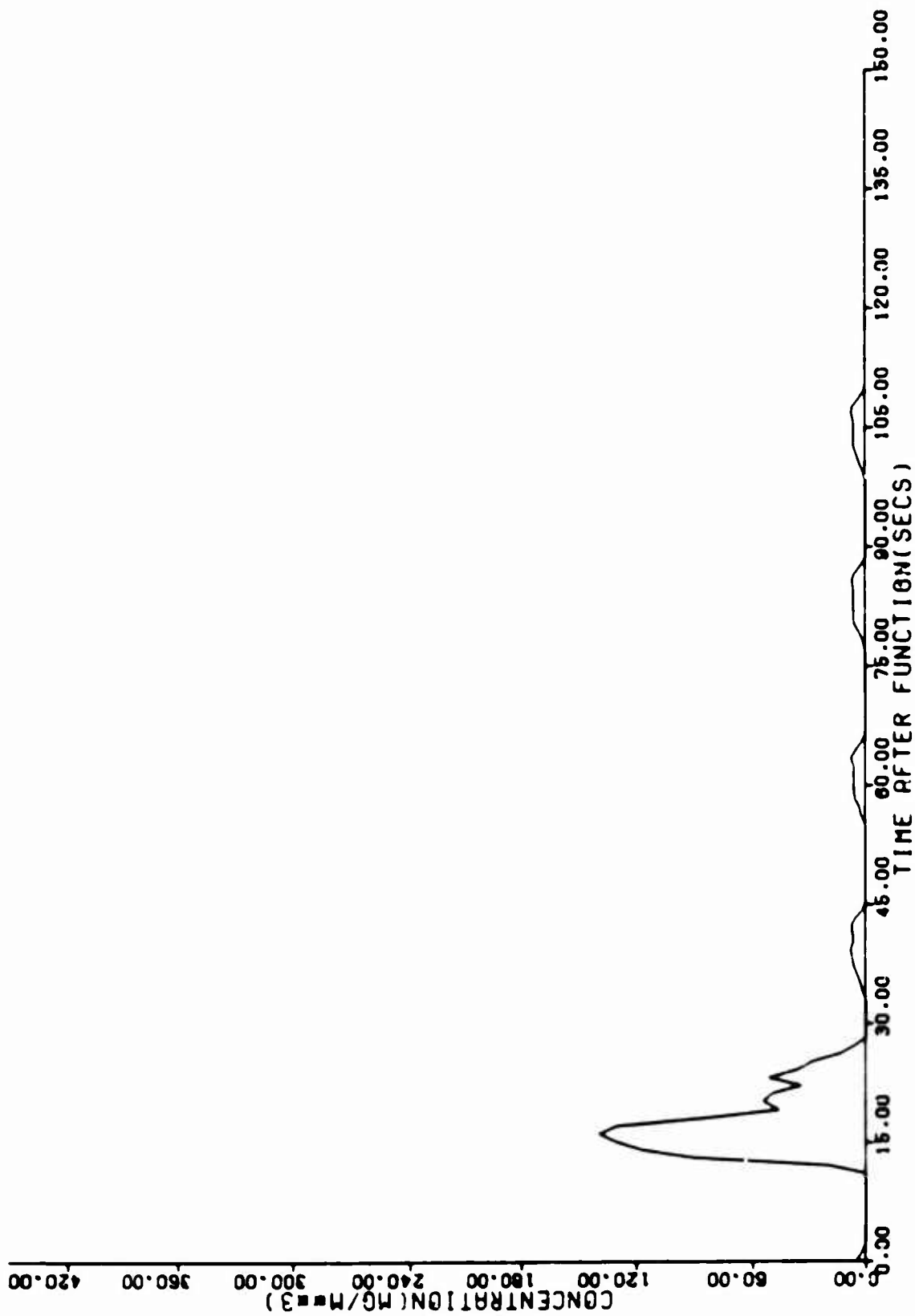
TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMOKE

ROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMOKE

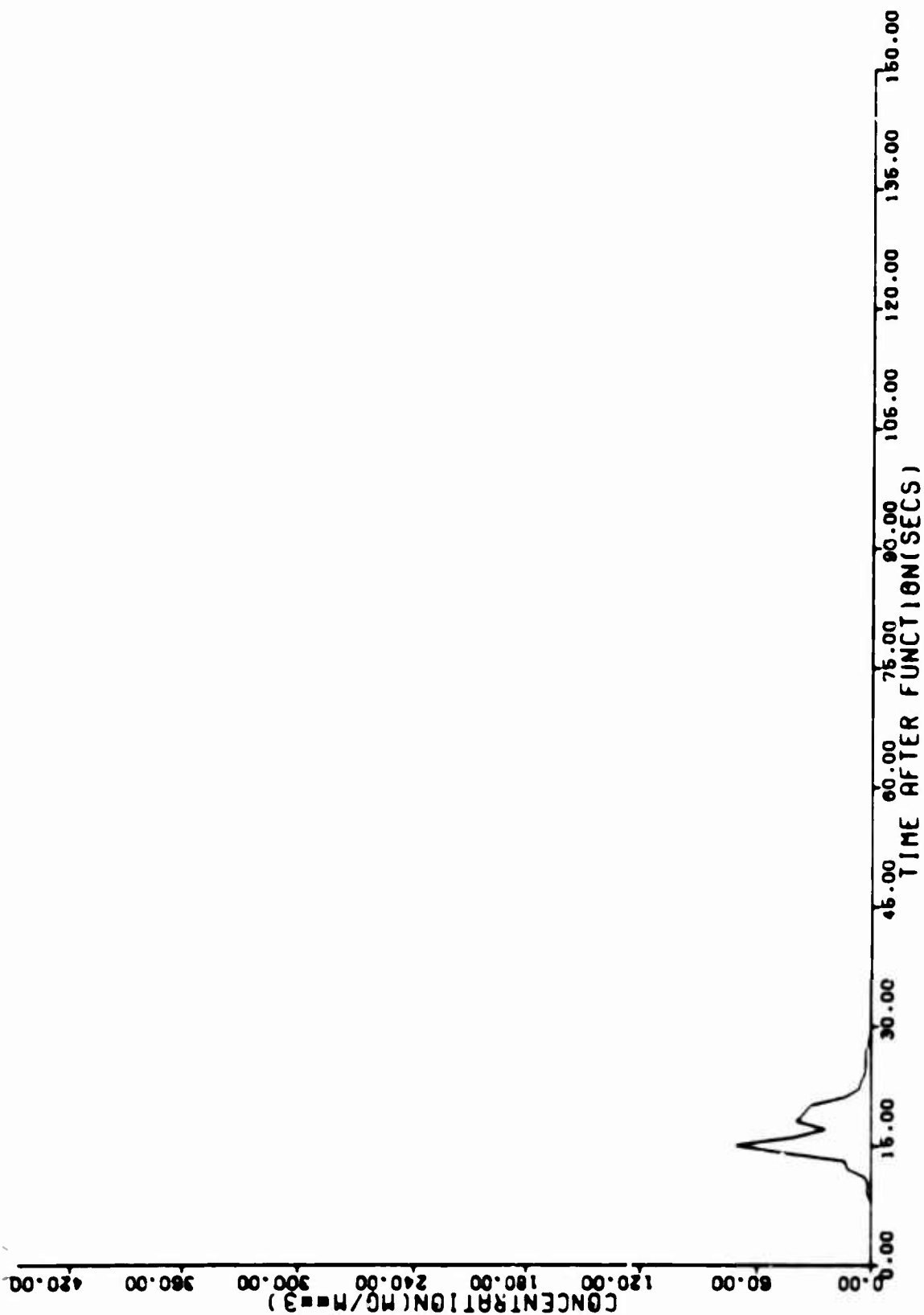
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



TRIAL 10 (DP-1002), 6 OCT 1977, 12:17:00, WP SMOKE

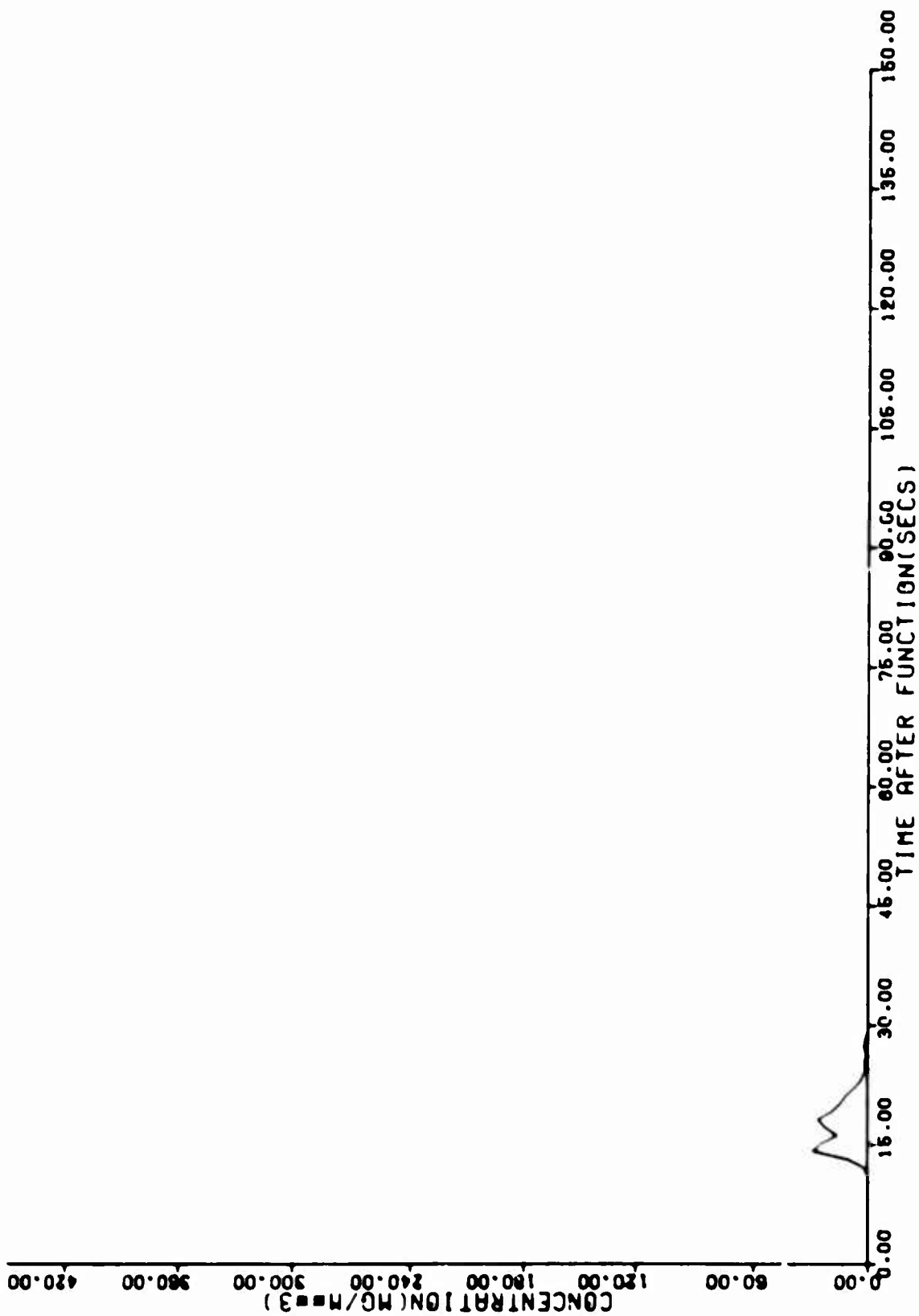
CFR080L PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00

8-1-8-13



TRIAL 10 (DP-1002). 6 OCT 1977. 12:17:00. WP SMOKE

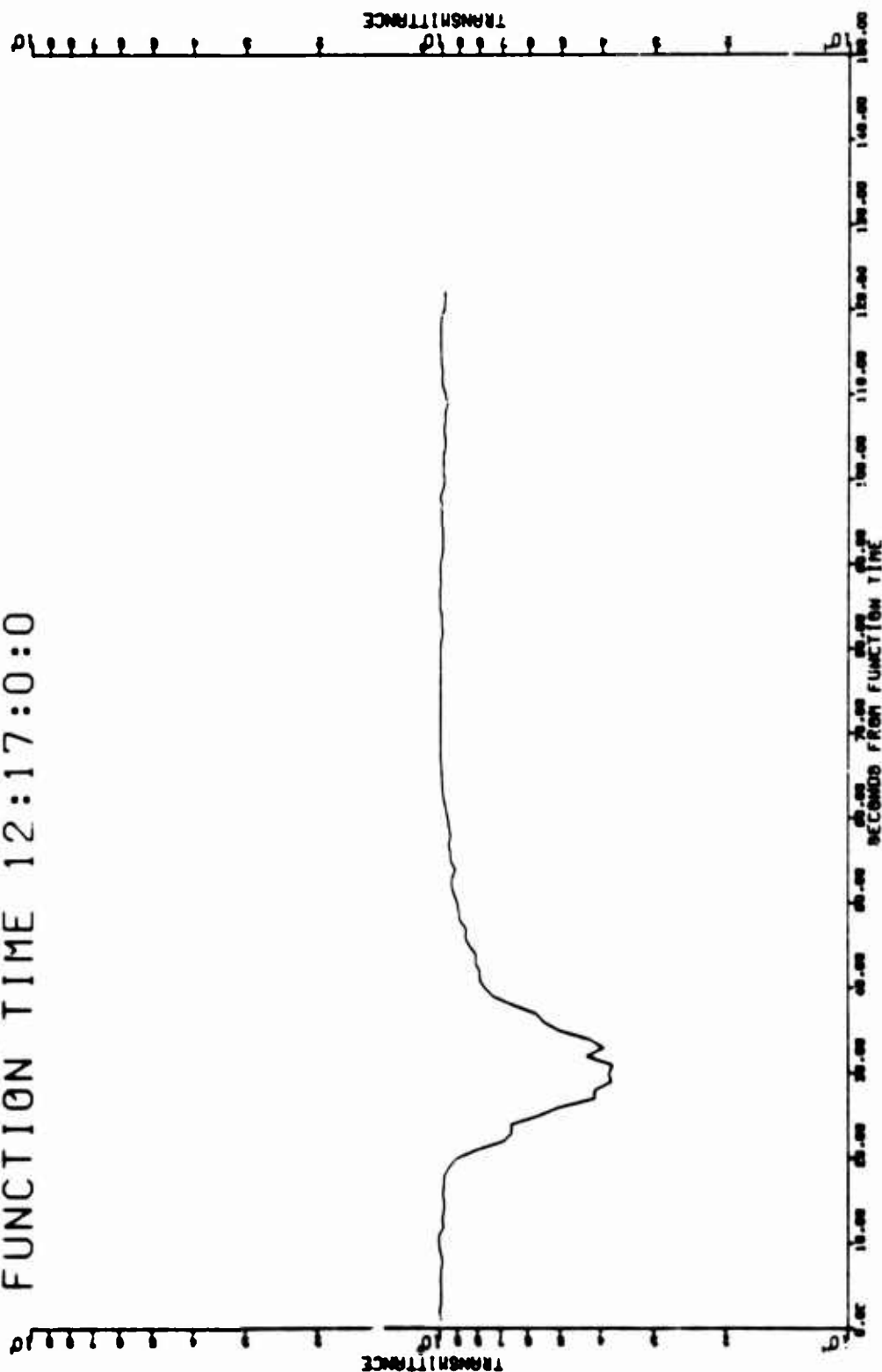
AEROSOL PHOTOMETER #11. X=0.00. Y=156.00. Z=0.00



TRIAL 10 (DP-1002). 6 OCT 1977, 12:17:00. WP SMOKE

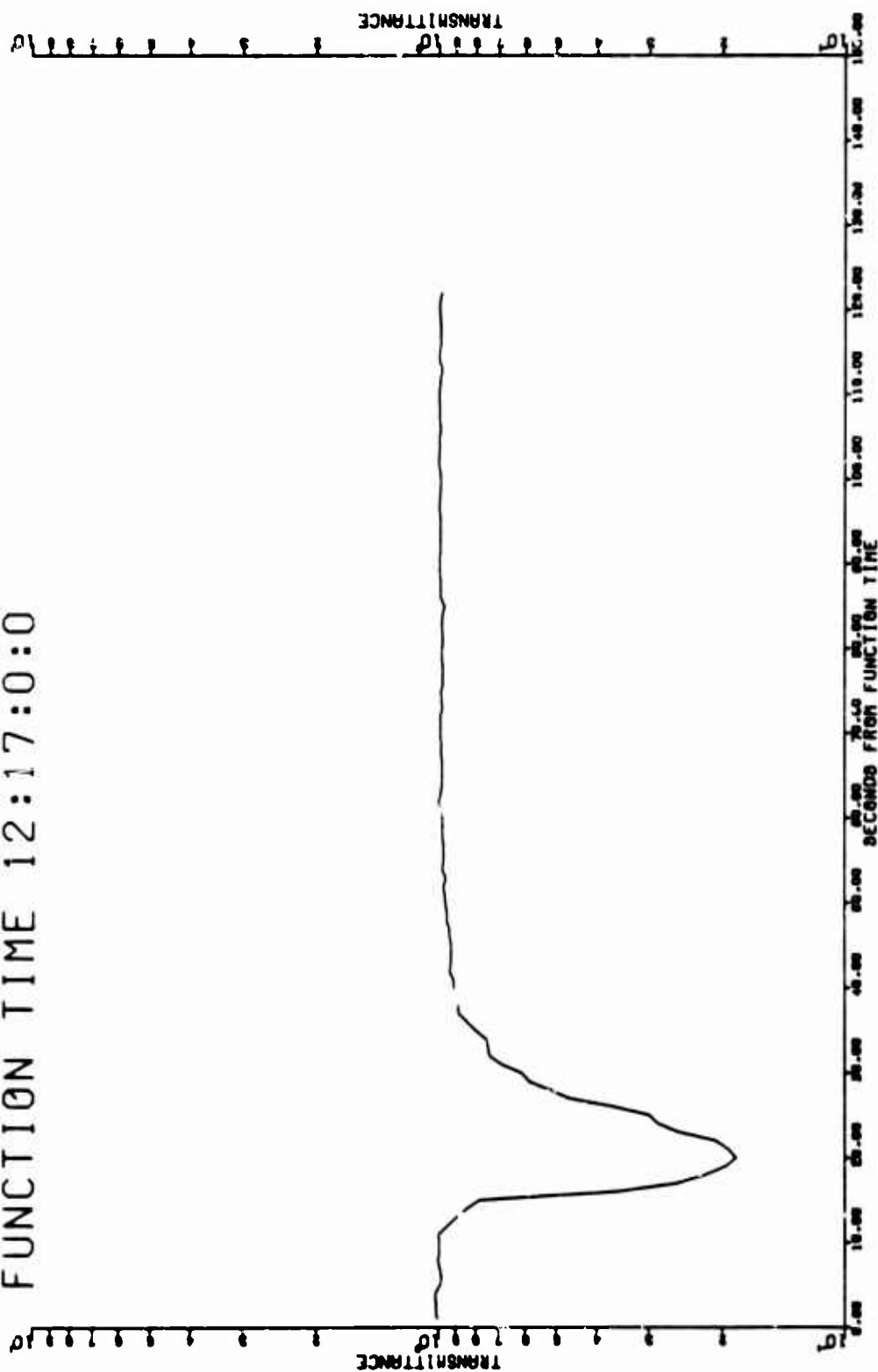
AEROSOL PHOTOMETER #12. X=0.00, Y=165.00, Z=0.00

TRIAL #10 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 12:17:0:0



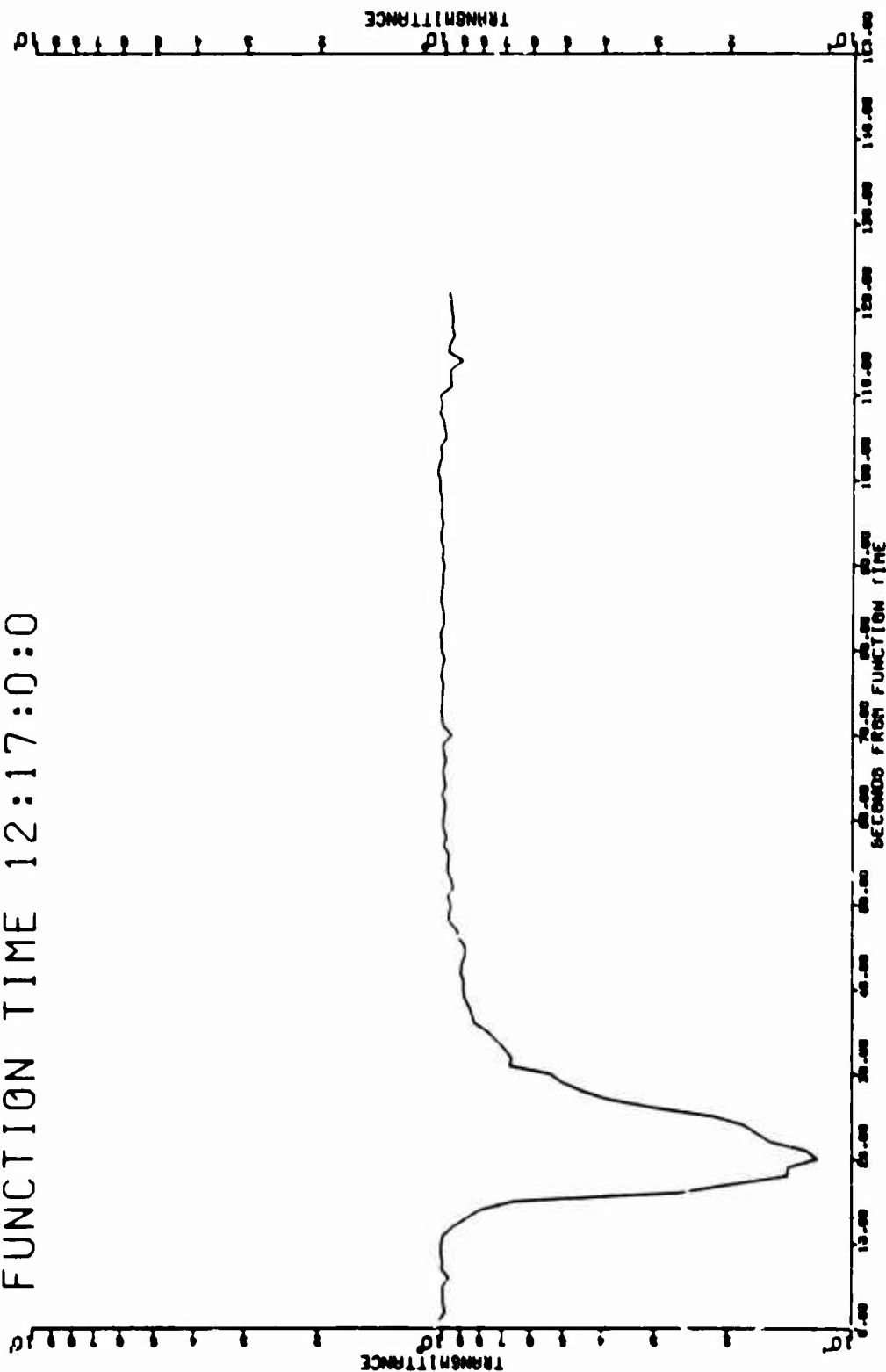
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #10 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 12:17:0:0



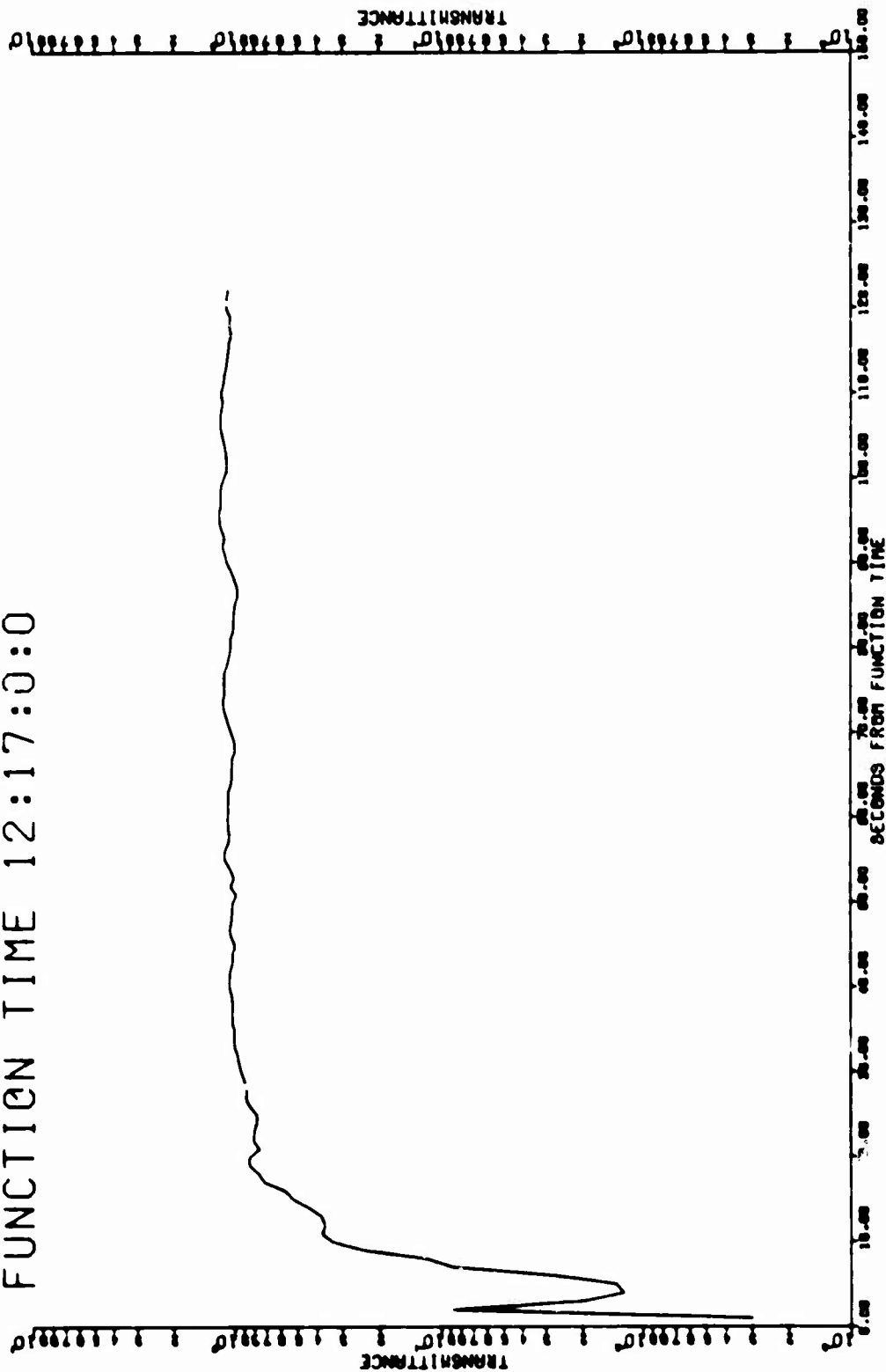
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #10 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 12:17:0:0



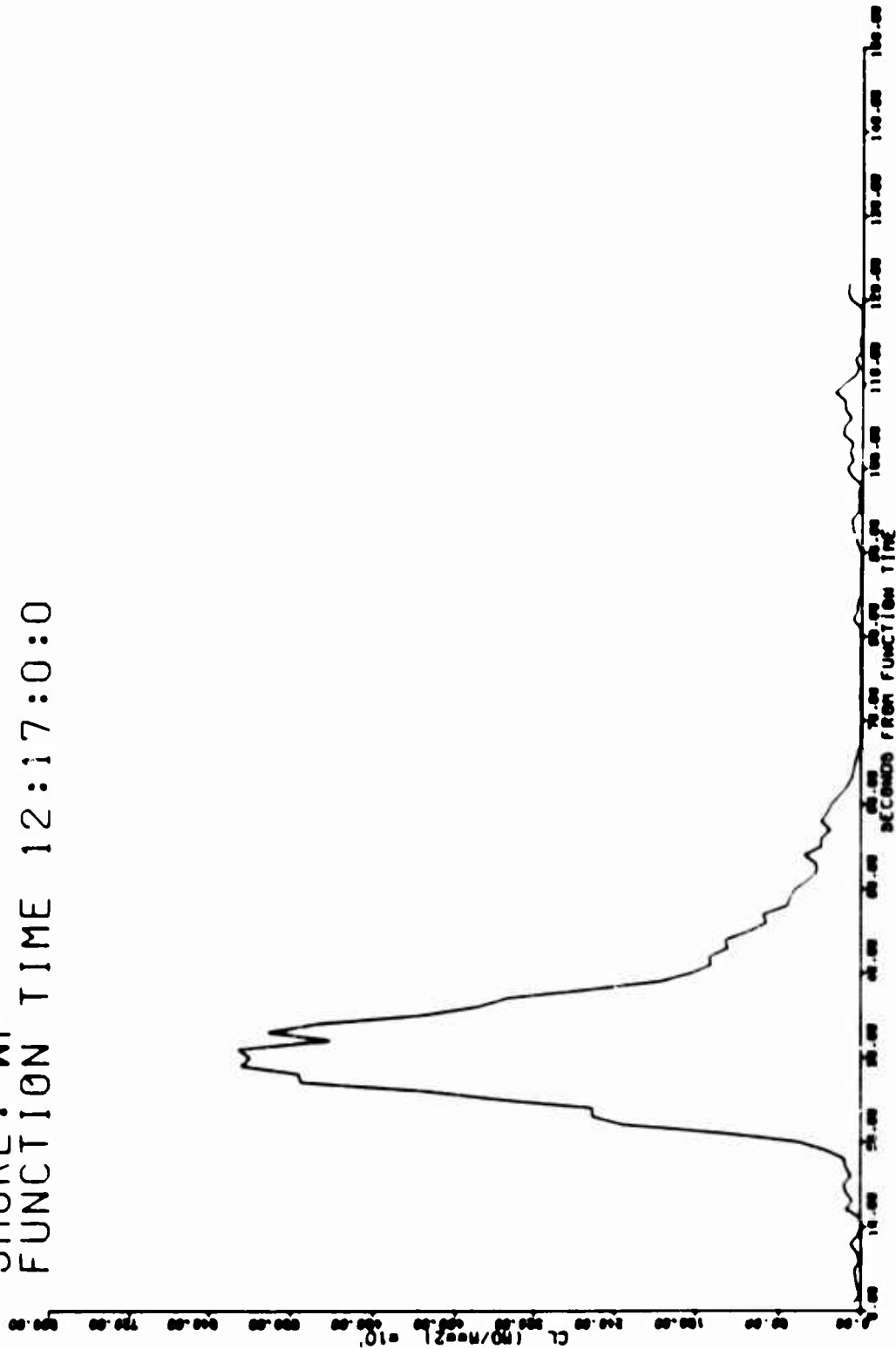
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #10 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 12:17:0:0



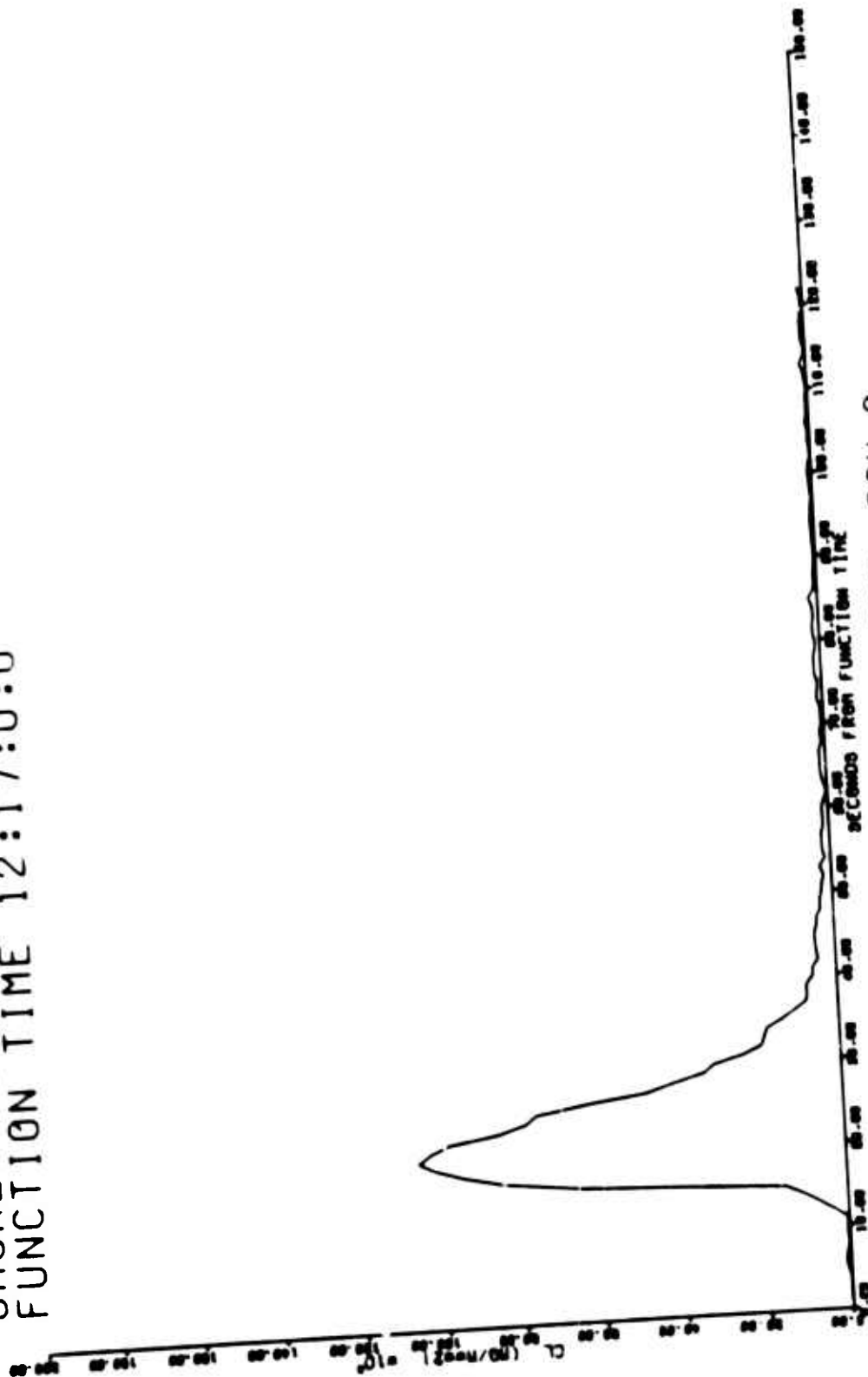
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #10 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 12:17:0:0



CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0



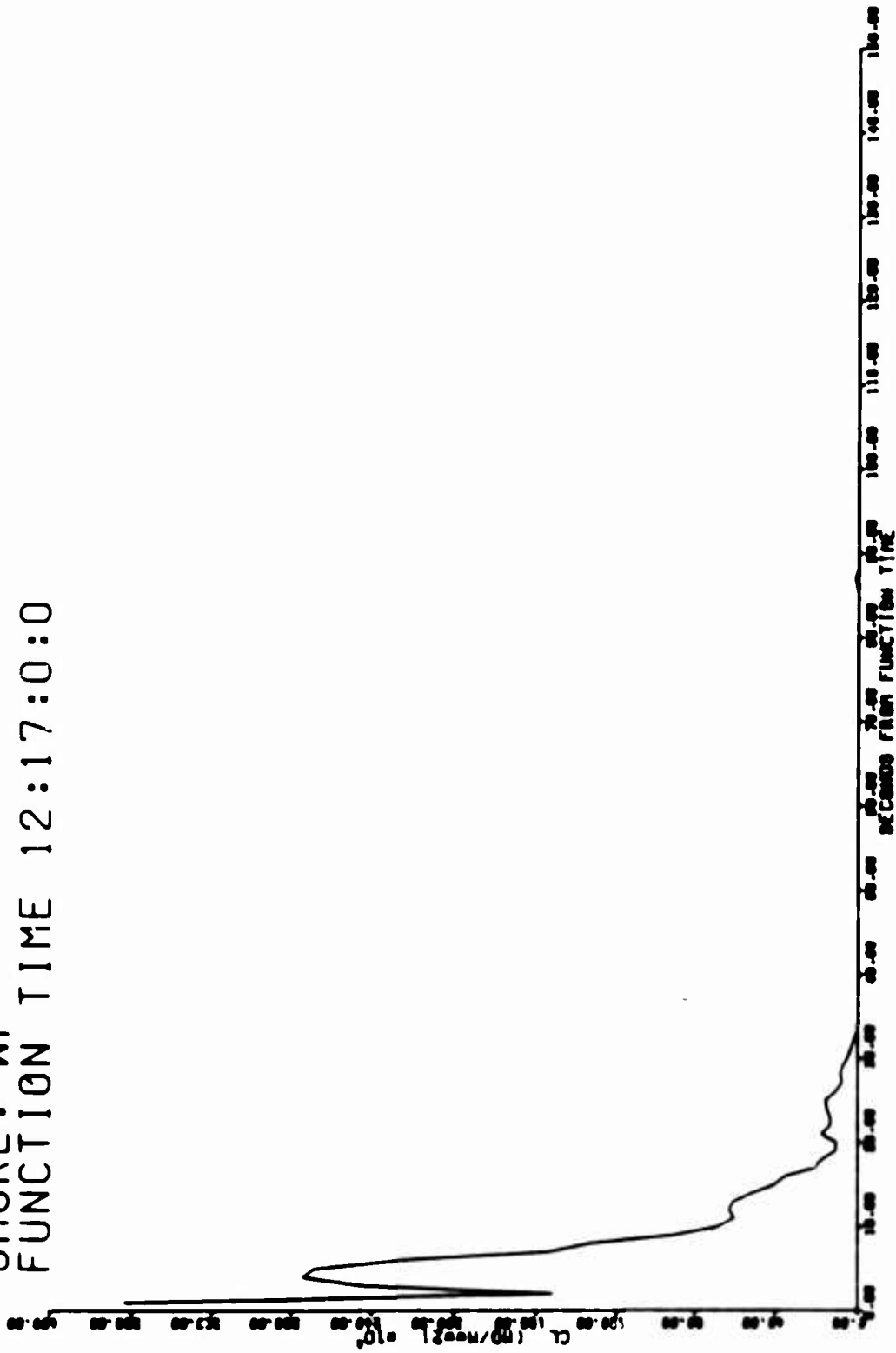
CL VALUES VERSUS TIME FOR POW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #10 (DP1-002)

DATE: 6 OCT 1977

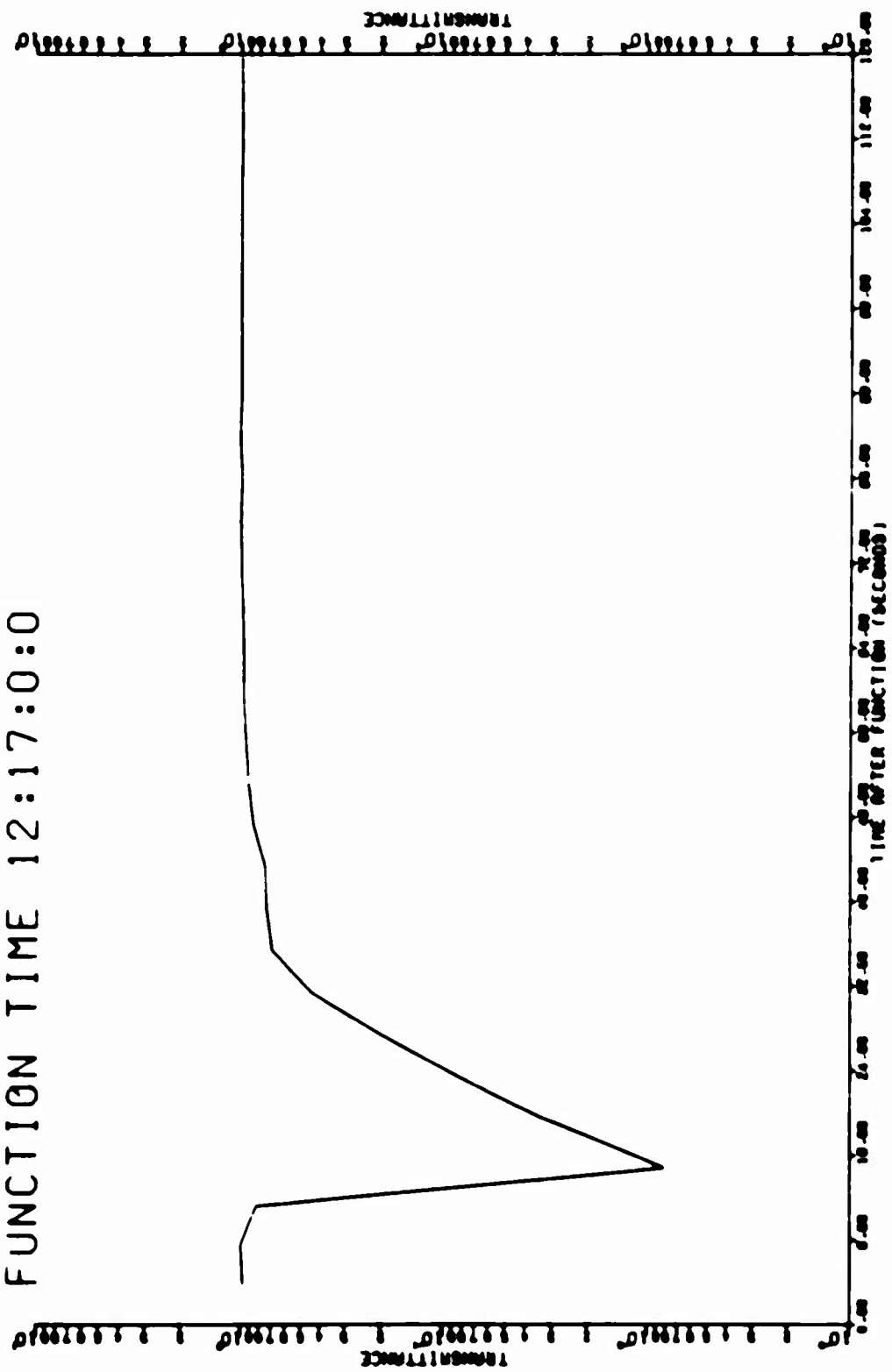
SMOKE: WP

FUNCTION TIME 12:17:0:0



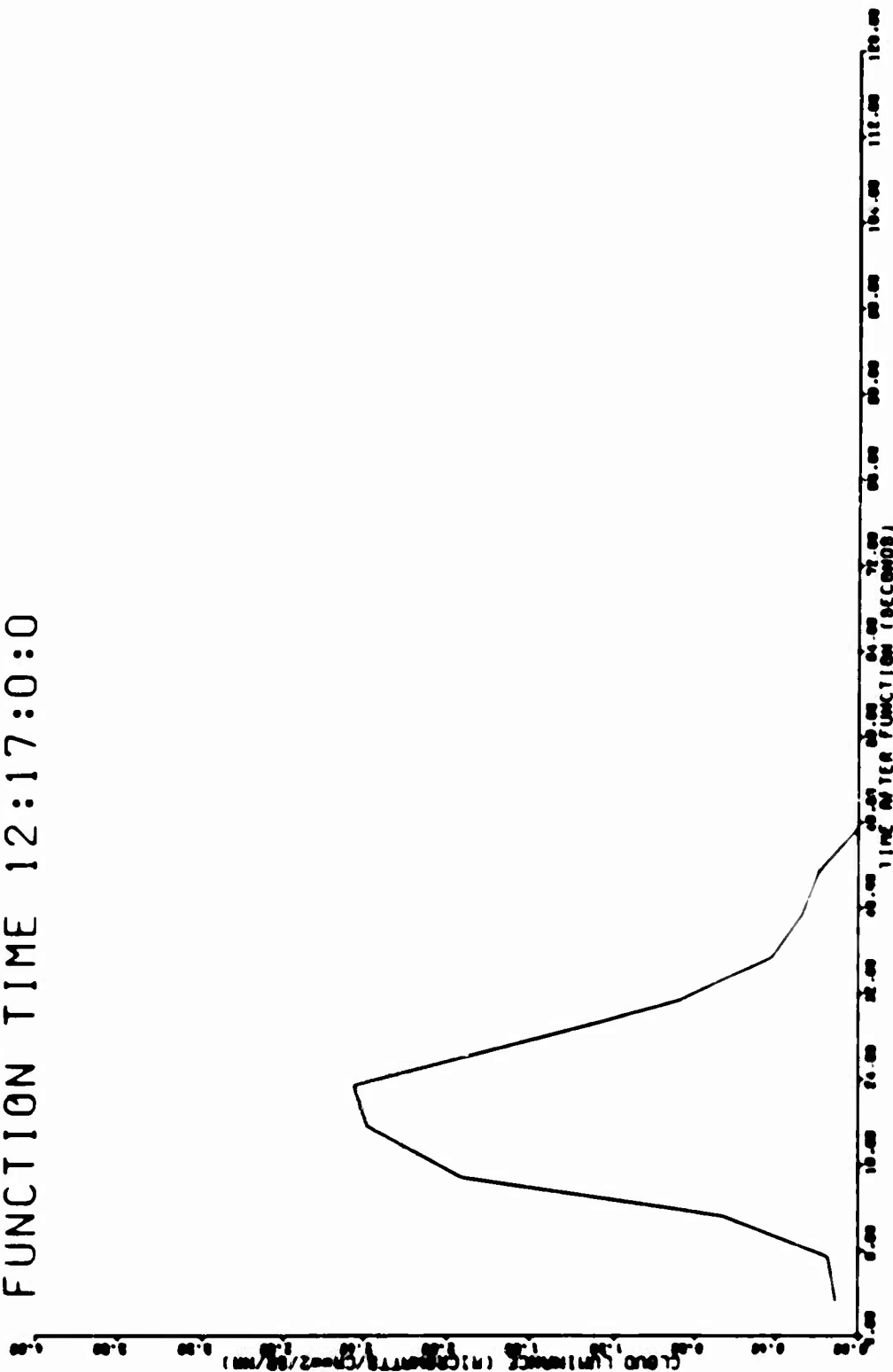
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0



TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0



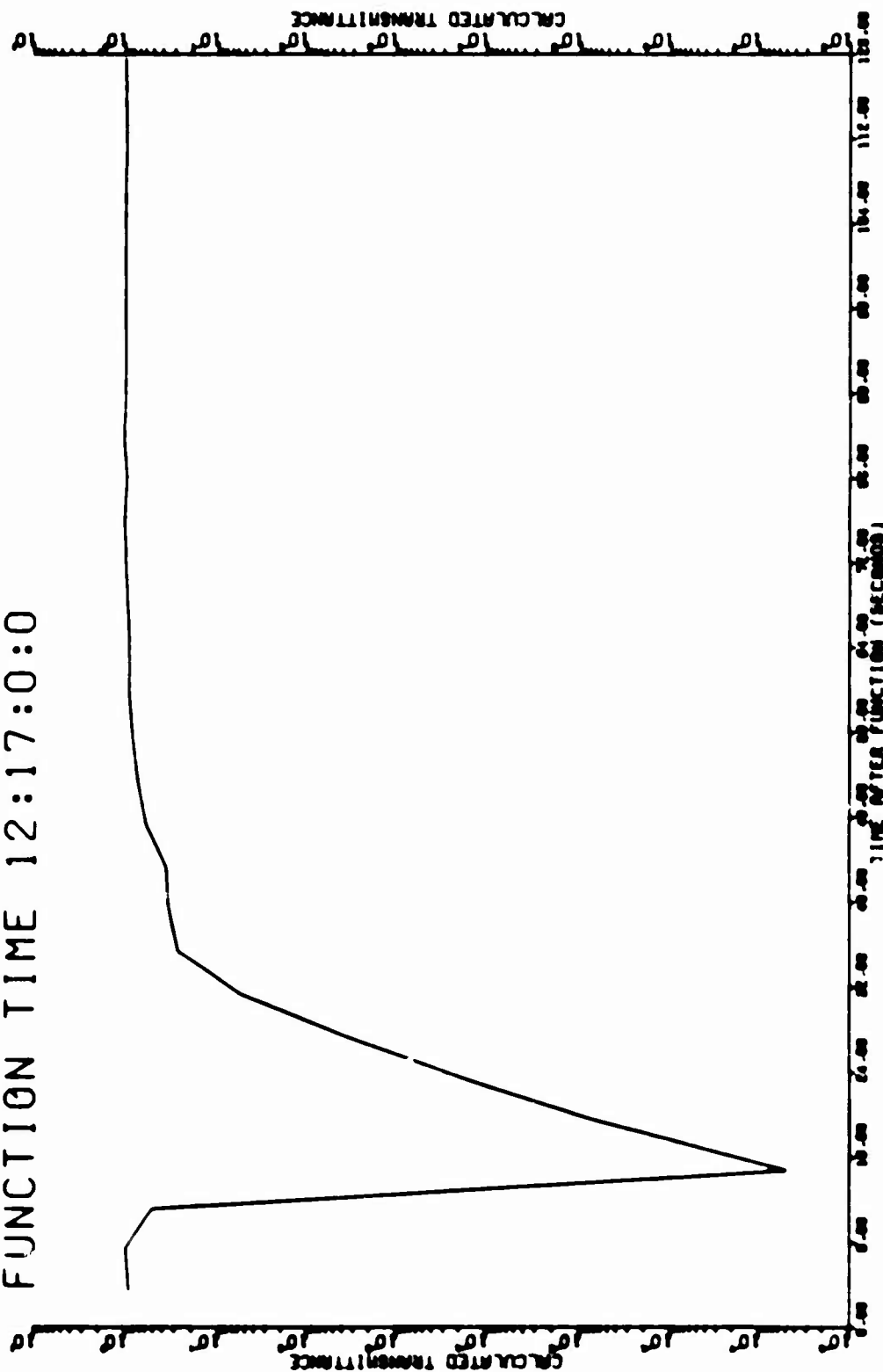
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #10 (DP1-002)

DATE: 6 OCT 1977

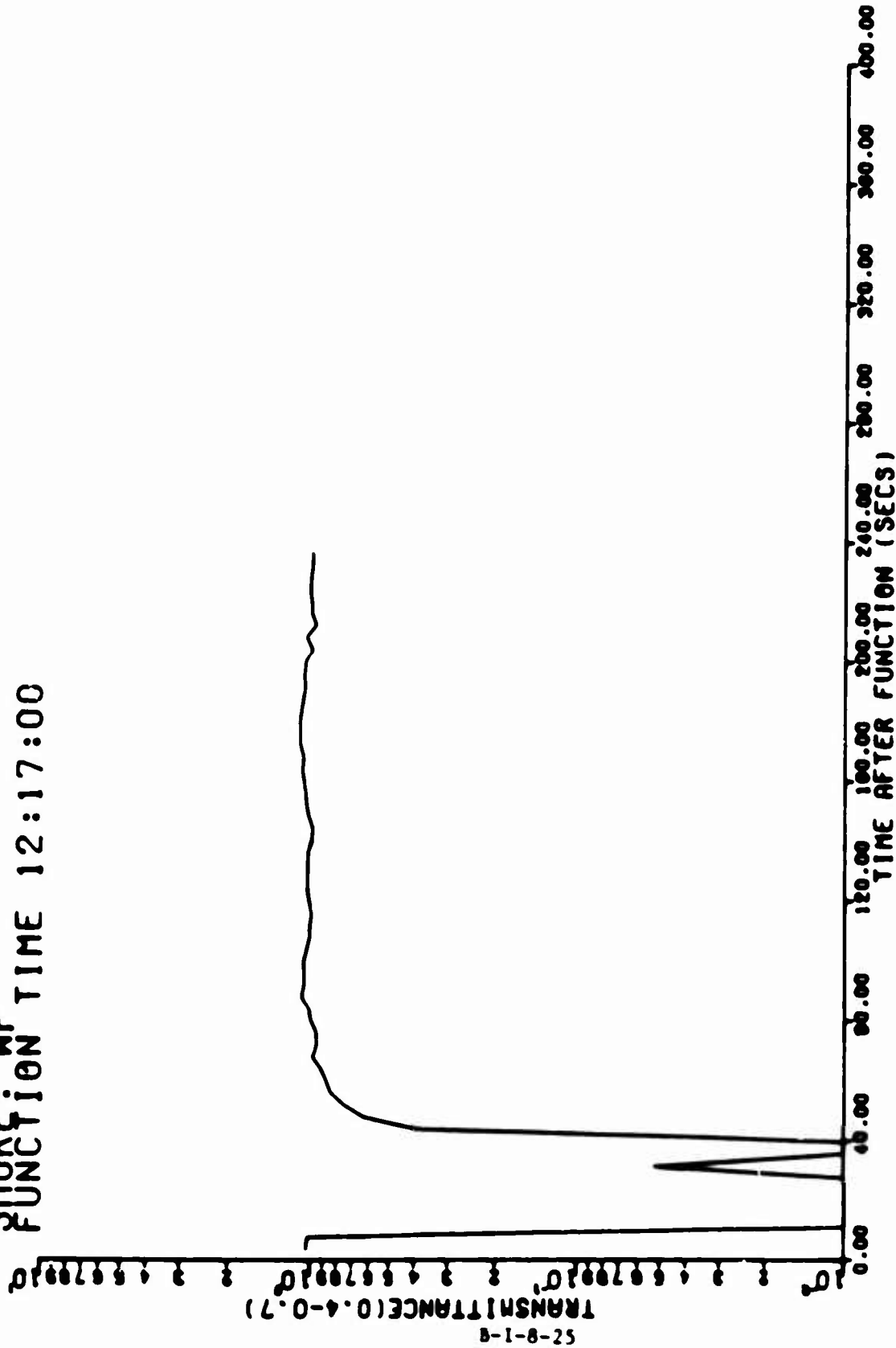
SMOKE: WP

FUNCTION TIME 12:17:0:0



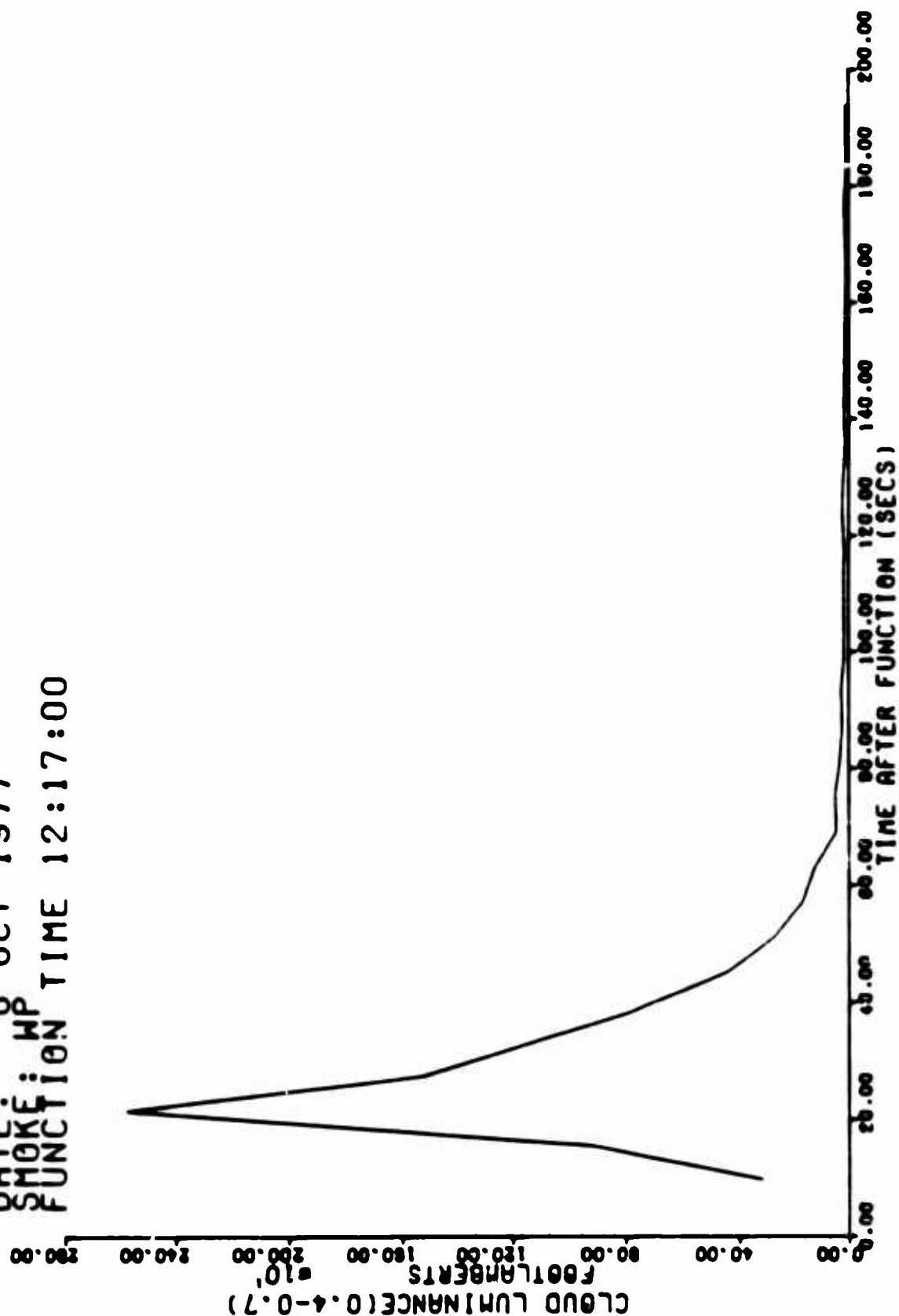
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

10 Oct 1977
 DATE: 10 Oct 1977
 WAVELENGTH: 0.7 MICRONS
 FUNCTION TIME 12:17:00



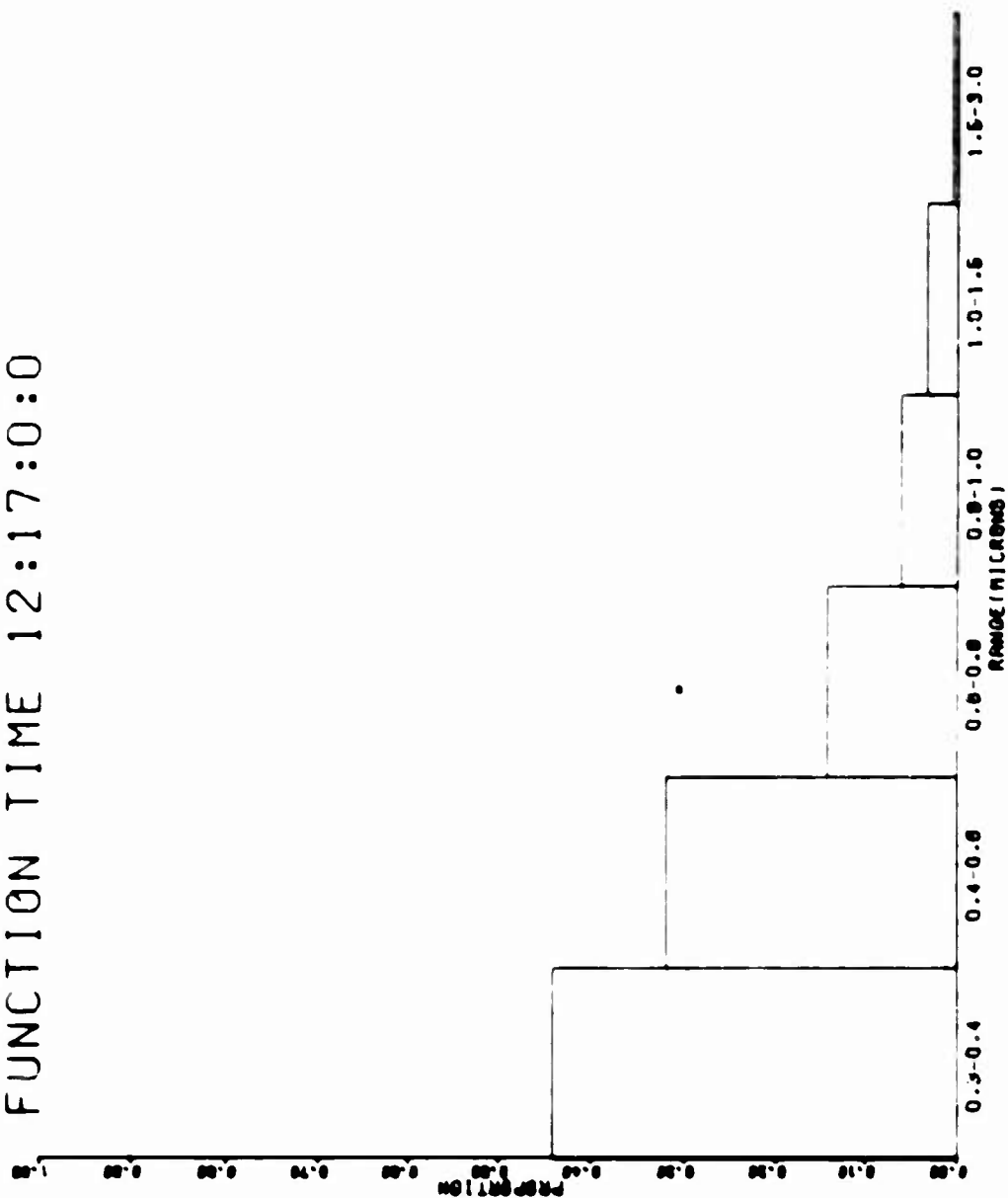
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 10, (OP-1002)
 DATE: 6 Oct 1977
 SMOKE: WP
 FUNCTION TIME 12:17:00



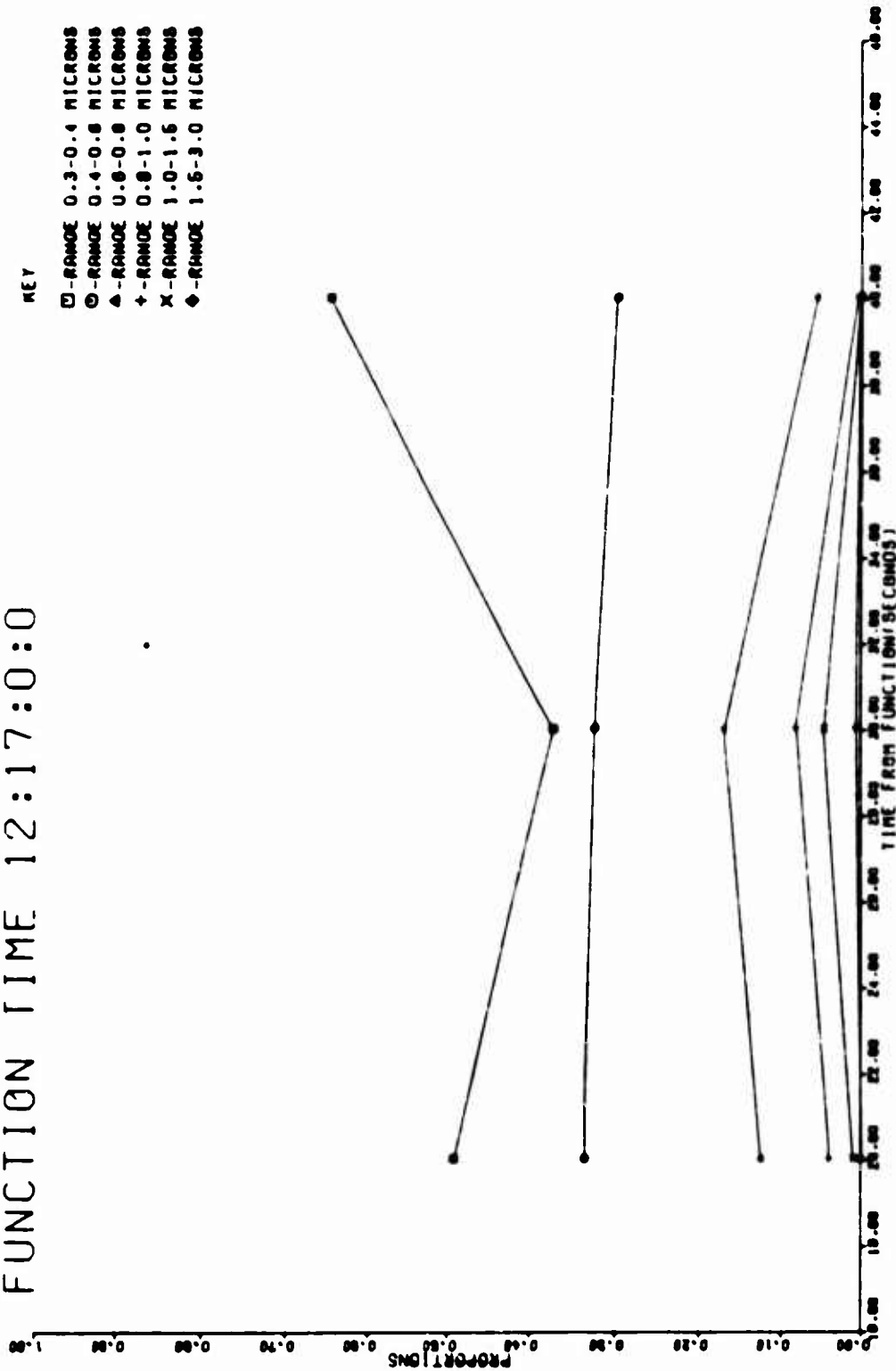
CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0



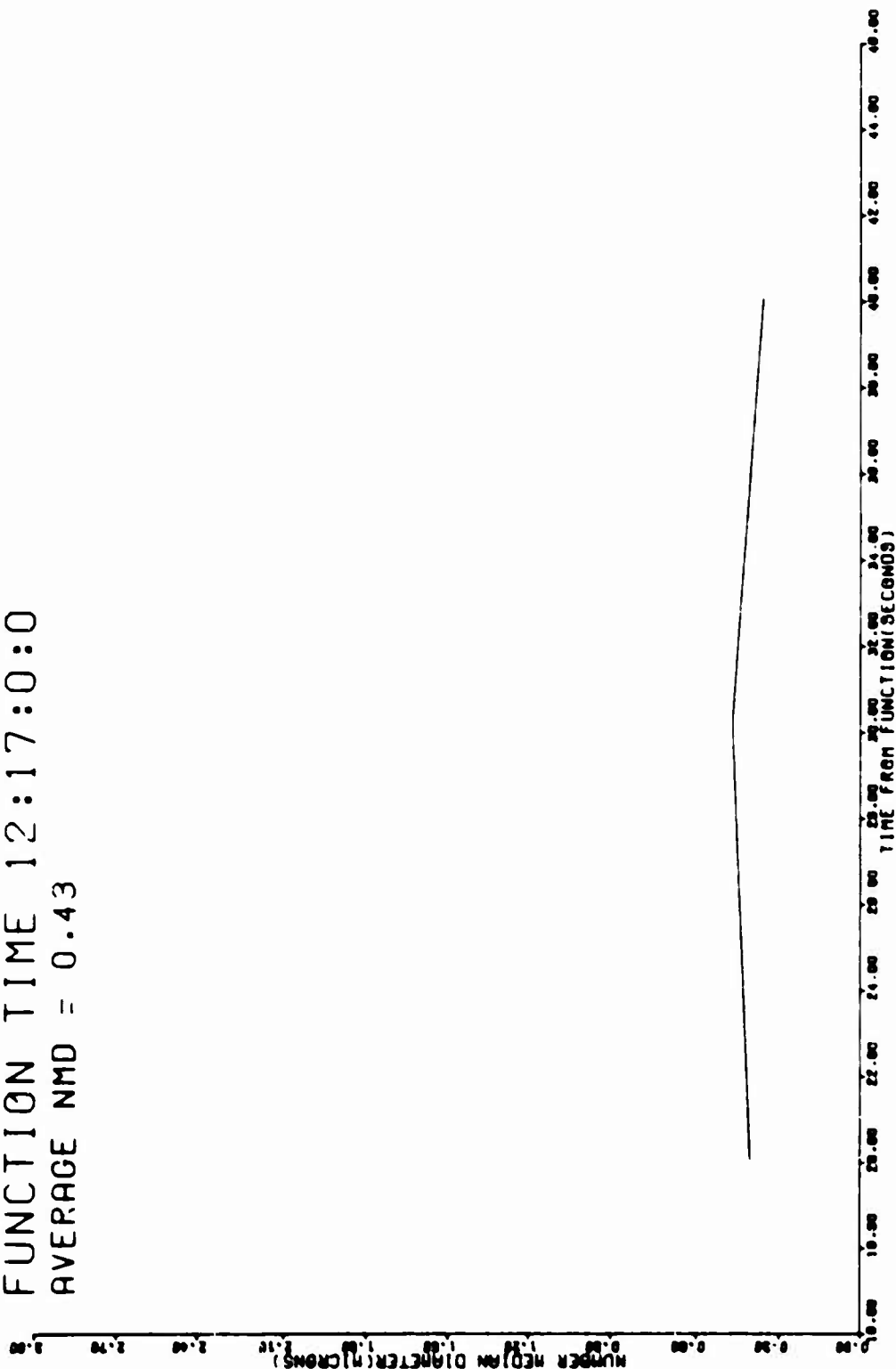
PARTICLE SIZE DISTRIBUTION BASED ON NUMBER

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #10 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:17:0:0
 AVERAGE NMD = 0.43



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-9

TRIAL DP1-002-T-14 (WP SMOKE) 27 OCT 1977

SUMMARY OF TEST DATA	B-I-9-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-9-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-9-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-9-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-9-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-9-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-9-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-9-21
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-9-22
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-9-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-9-24
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-9-25
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FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-9-27
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FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-1-9-31
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SUMMARY OF TEST DAY DATA

Trial: 14

Date: 27 Oct 77

Time: 1327:00 MDT

Wind Direction (Transport) (degrees) (4m)	187
Mean Wind Speed (Transport) (\bar{u} , m/sec)	7.2
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	13.4
Temperature at 2-meters, Trial Time (T, °C)	23.0
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	4.4
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.9
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.11
Pasquill Stability Category	D
Relative Humidity (percent) (2m)	26
Solar Azimuth (deg)	183.2
Solar Altitude (deg)	35.8
Air Density - ρ (kg m ⁻³)	1.013
Solar Radiation (Langley's per minute)	1.024
Barometric Pressure (millibars)	863.9
Visibility (km)	80
Reflectivity, OD Target	0.1
Haze (footlamberts)	185
Brightness, Background (footlamberts)	850
Brightness, White Target (footlamberts)	1758
Brightness, OD Target	350
Percent Opaque Cloud Cover	2

Munitions/Submunitions Used (PWP, 4.2 inch) 4
 Number of Munitions/Submunitions Functioned 4
 Particle Size Range (micron)
 (0.3 - 0.4)40
 (0.4 - 0.6)32
 (0.6 - 0.8)15
 (0.8 - 1.0)07
 (1.0 - 1.5)04
 (1.5 - 3.0)01
 Log₁₀^{NMD} -.34554
 °Log₁₀^{NMD}21407
 NMD45
 MMD58

Initial Cloud Dimensions (Meters)

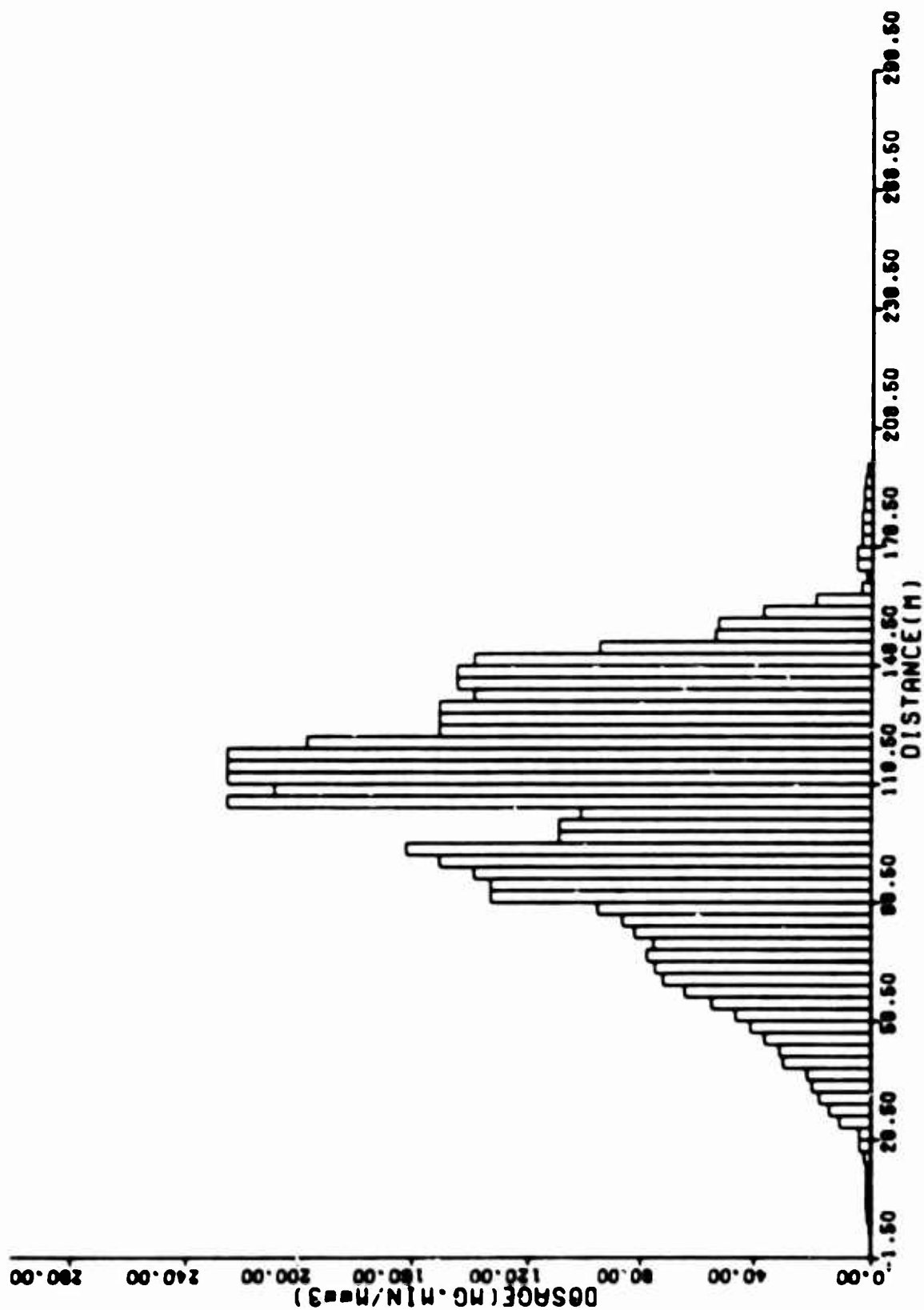
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1327:00	22	23	4
1327:10	51	35	8
1327:20	105	41	17
1327:30	176	67	24
1327:40	195	92	24
1327:50	249	97	20
1328:00	294	100	13
1328:10	290	120	12
1328:20	210	119	11
1328:30	147	122	10
1328:40	134	108	9
1328:50	106	95	6
1329:00	102	93	5

SKY BRIGHTNESS

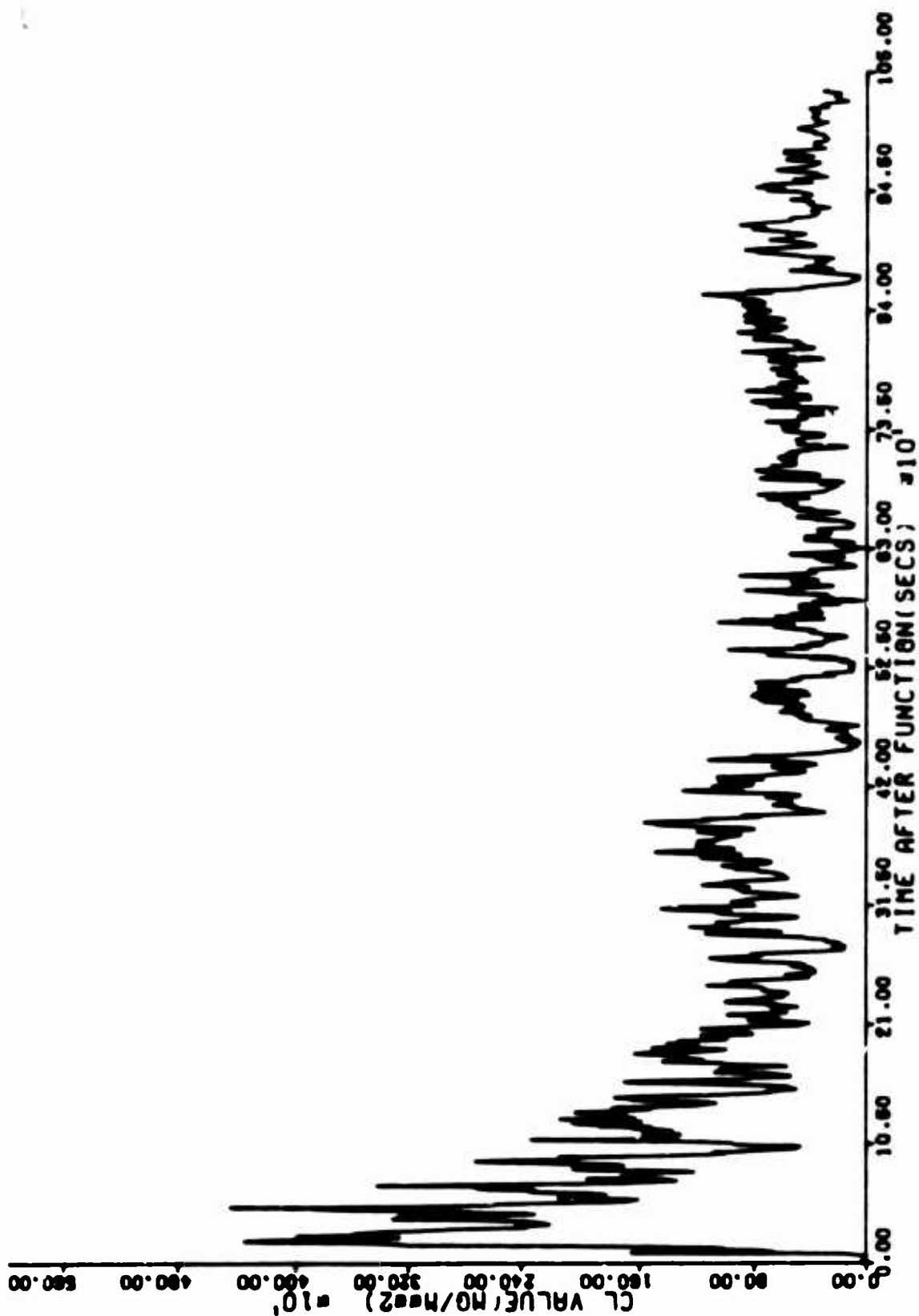
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	652
5	1084
10	1084
15	1140
20	1140
25	1140
30	1300
35	1300
40	1140
45	1140

Viewing azimuth 240° except 255° at 0 degrees elevation

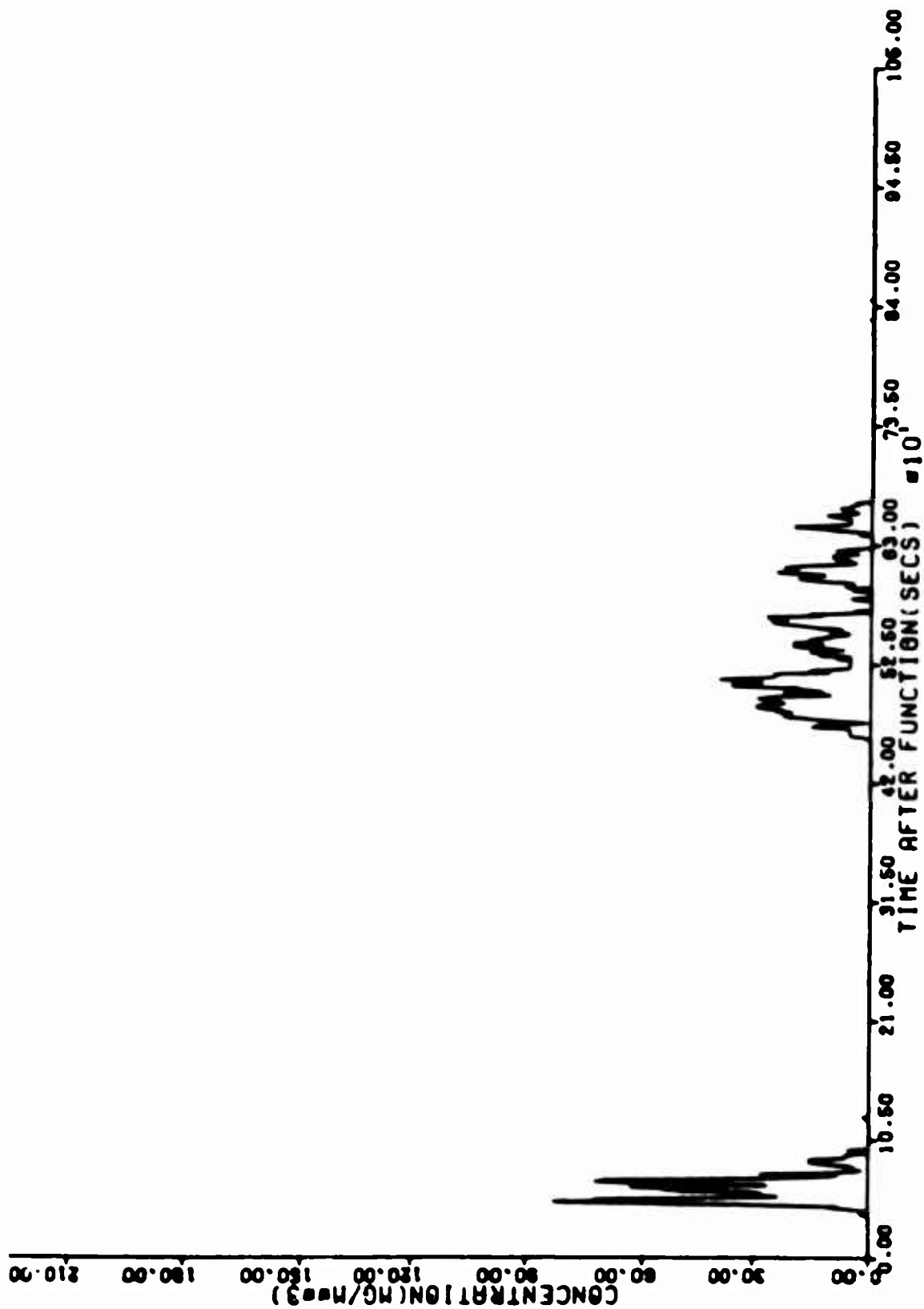


TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMO, 2



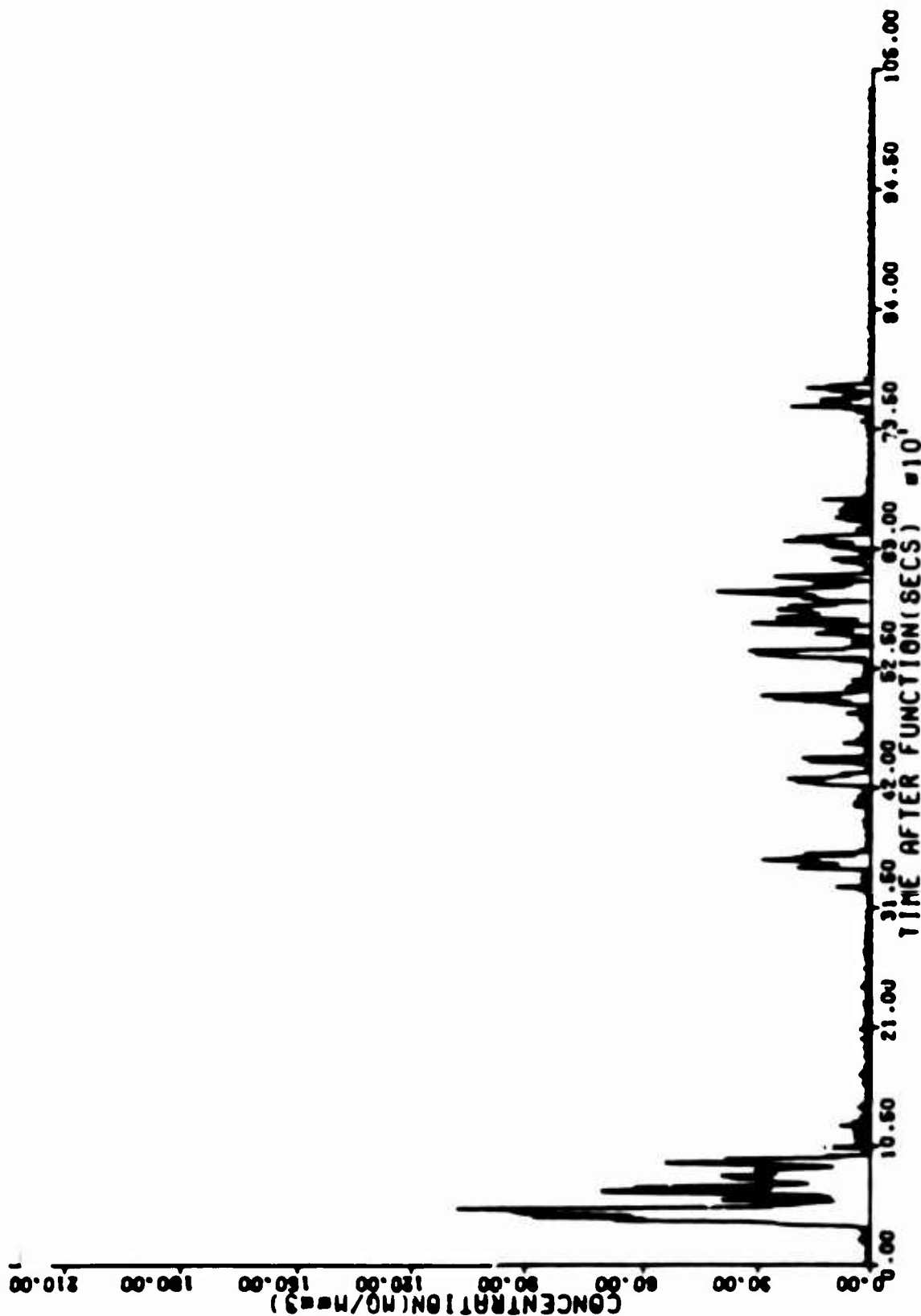
TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

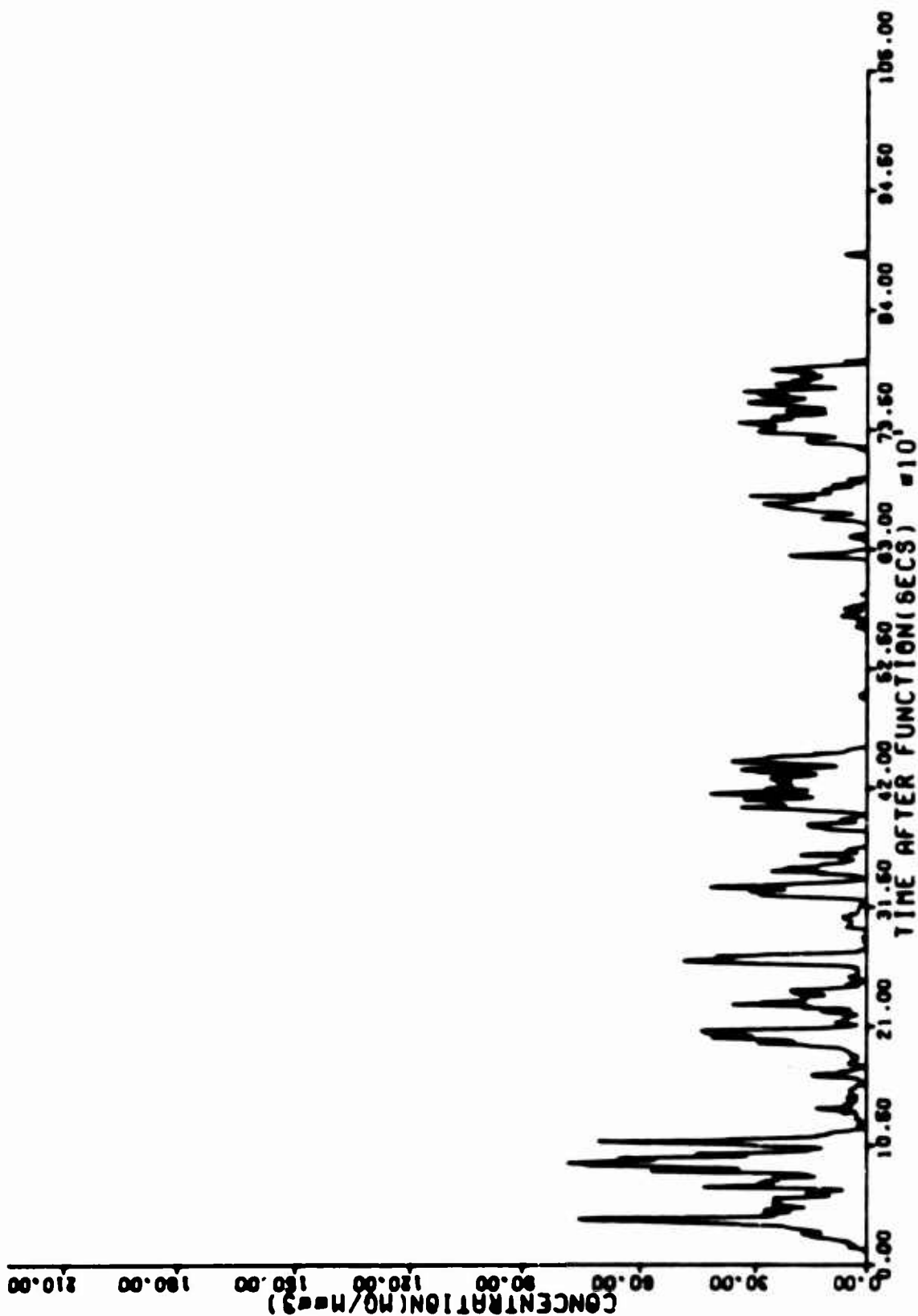
NEBROSOL PHOTOMETER #4, X=0.00, Y=66.00, Z=0.00



B-1-9-9

TRIAL 14 (DP-1002). 27 OCT 1977. 13:27:00. WP SMOKE

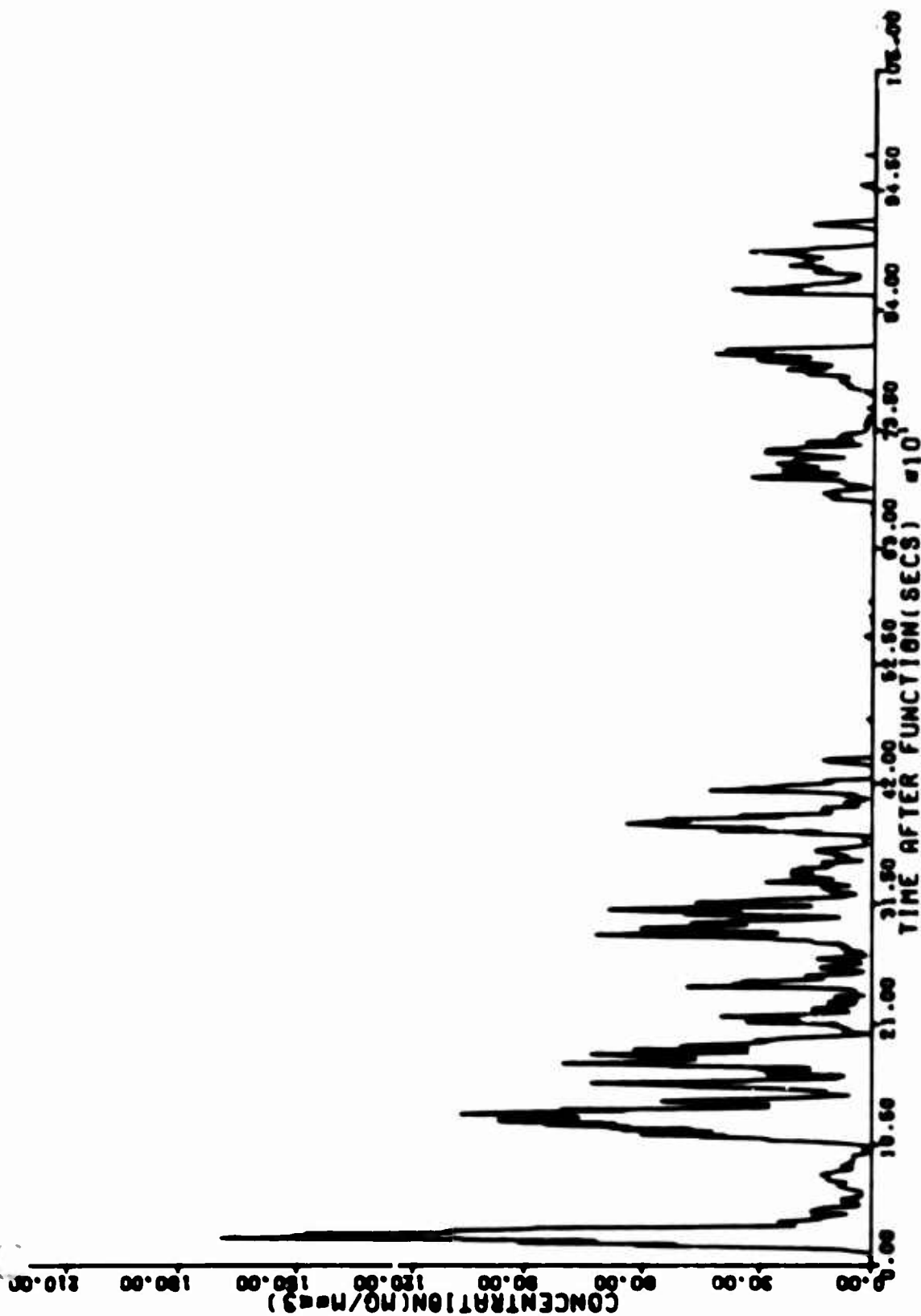
AEROSOL PHOTOMETER #5. X=0.00. Y=84.00. Z=0.00



TRIAL 14 (DP-1002). 27 OCT 1977. 13:27:00. WP SMOKE

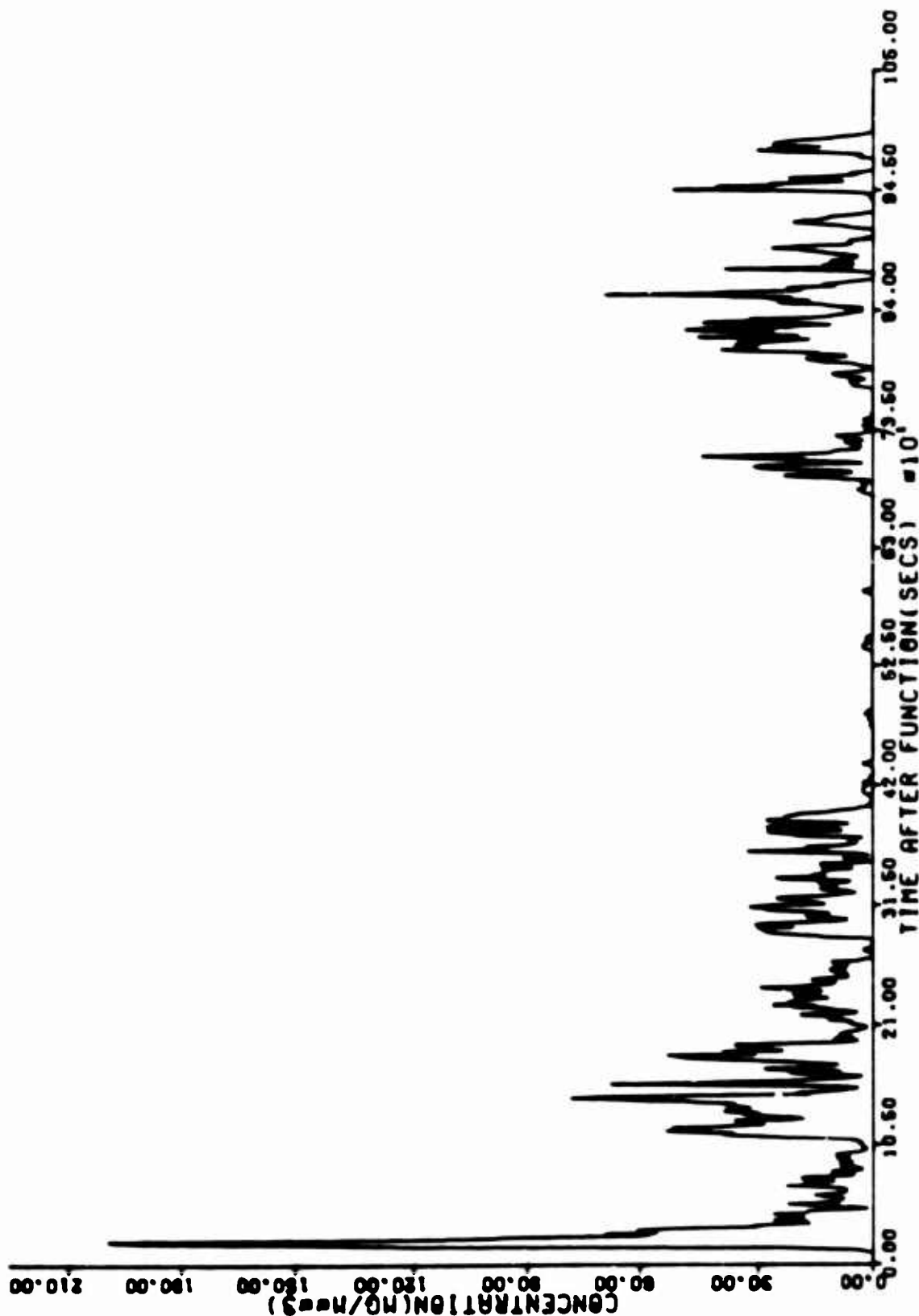
AEROSOL PHOTOMETER #6. X=0.00. Y=102.00. Z=0.00

11-6-1-8



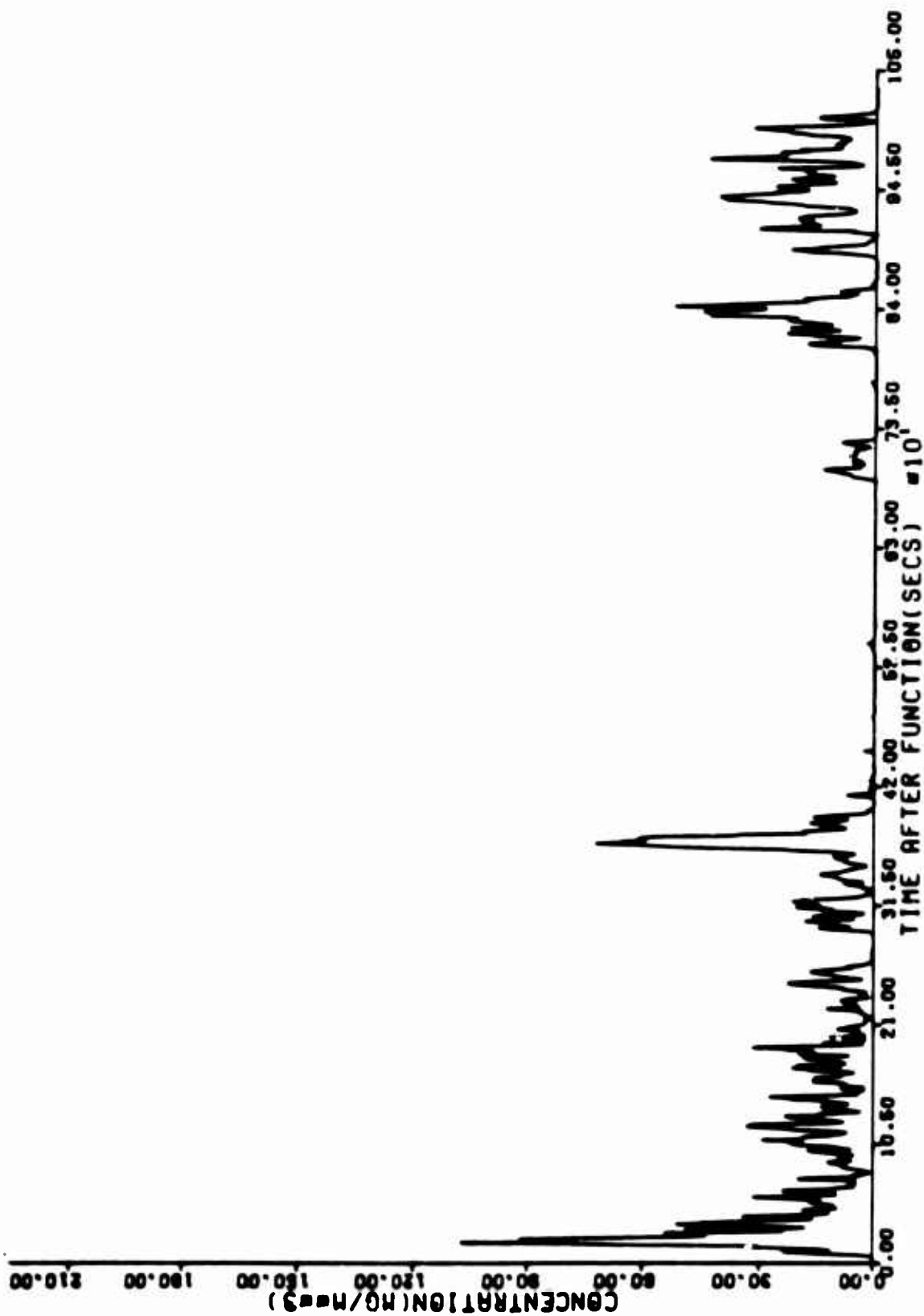
TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



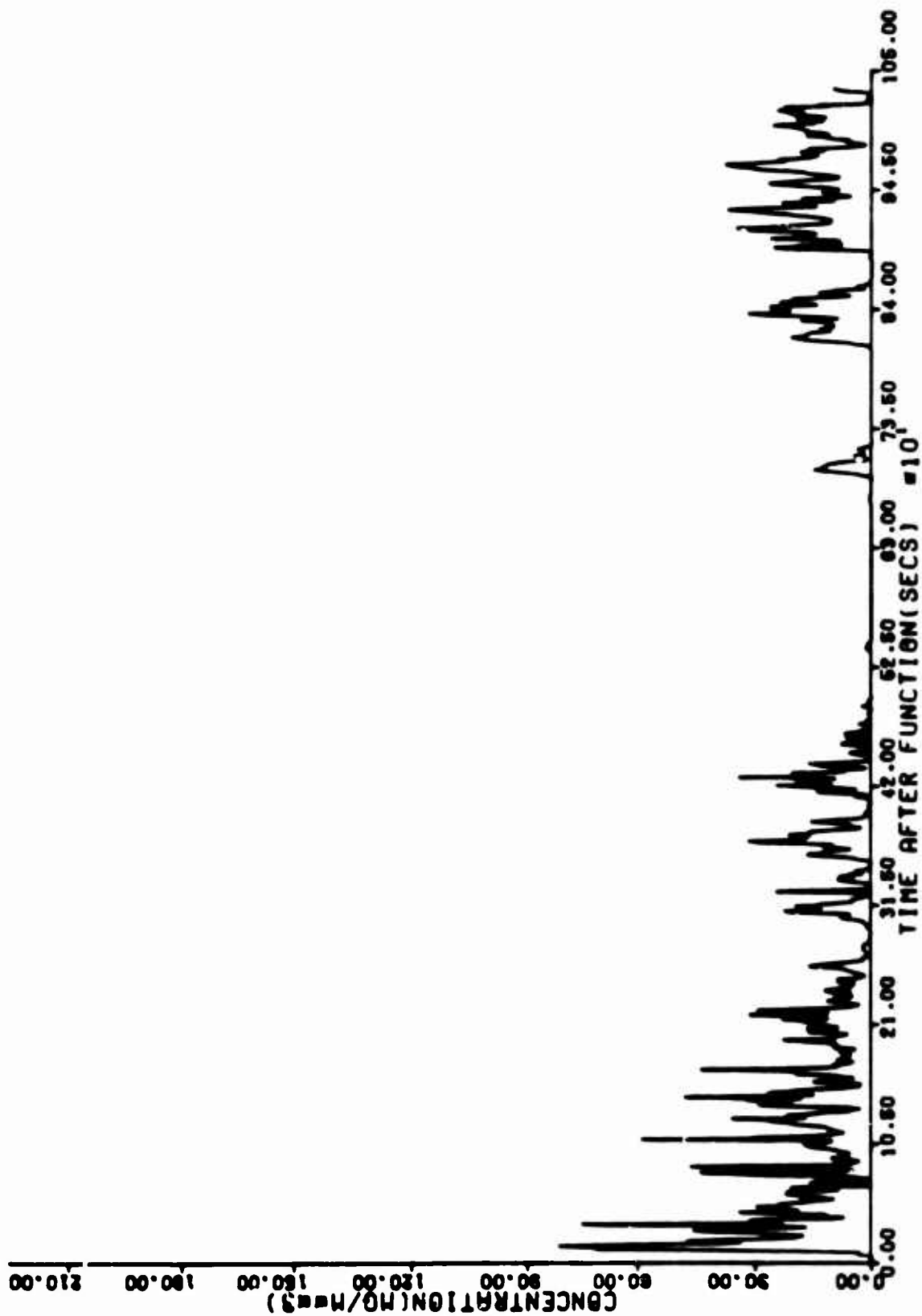
TRIAL 14 (DP-1002). 27 OCT 1977. 13:27:00. WP SMOKE

AEROSOL PHOTOMETER #8. X=0.00. Y=129.00. Z=0.00



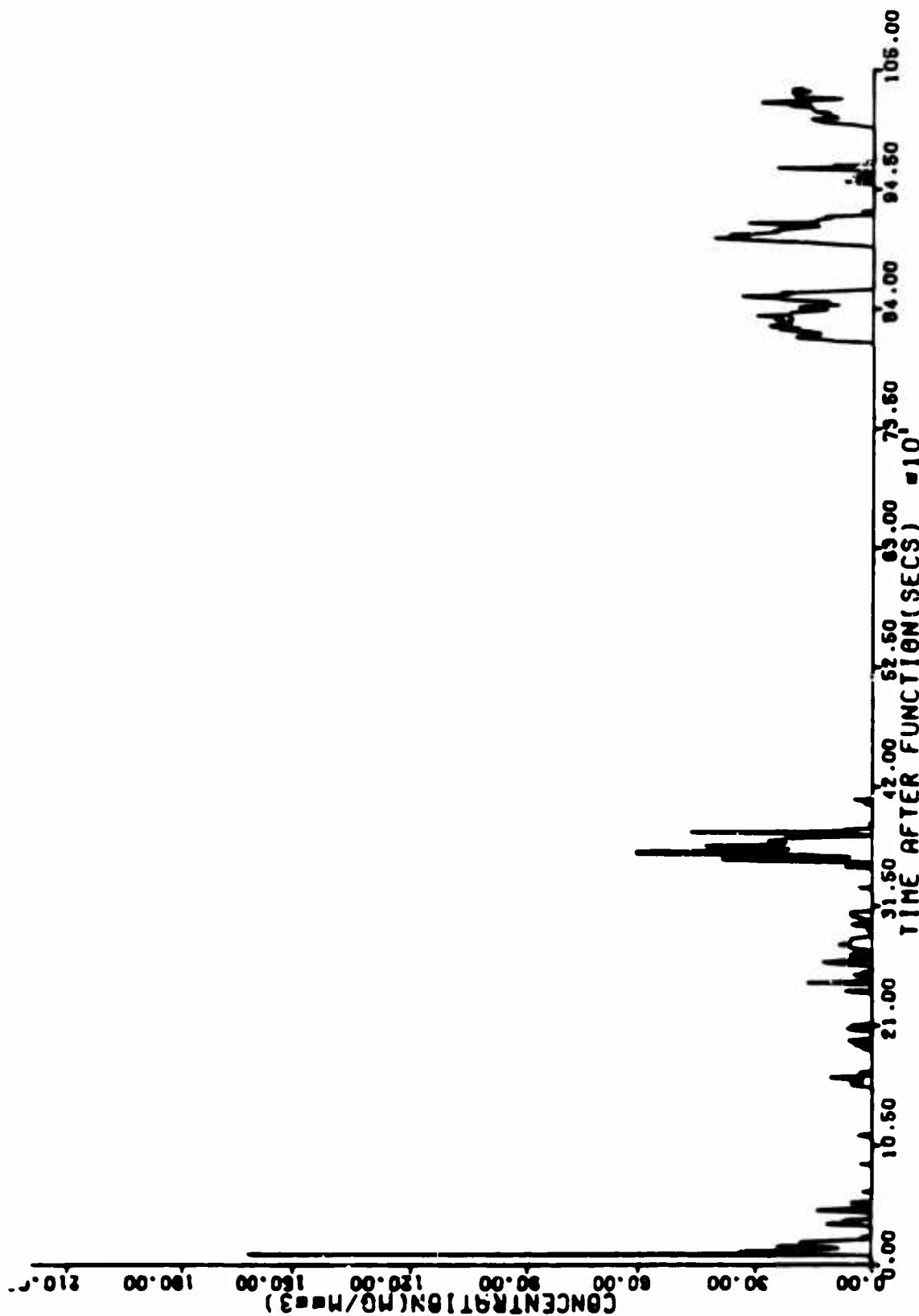
TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



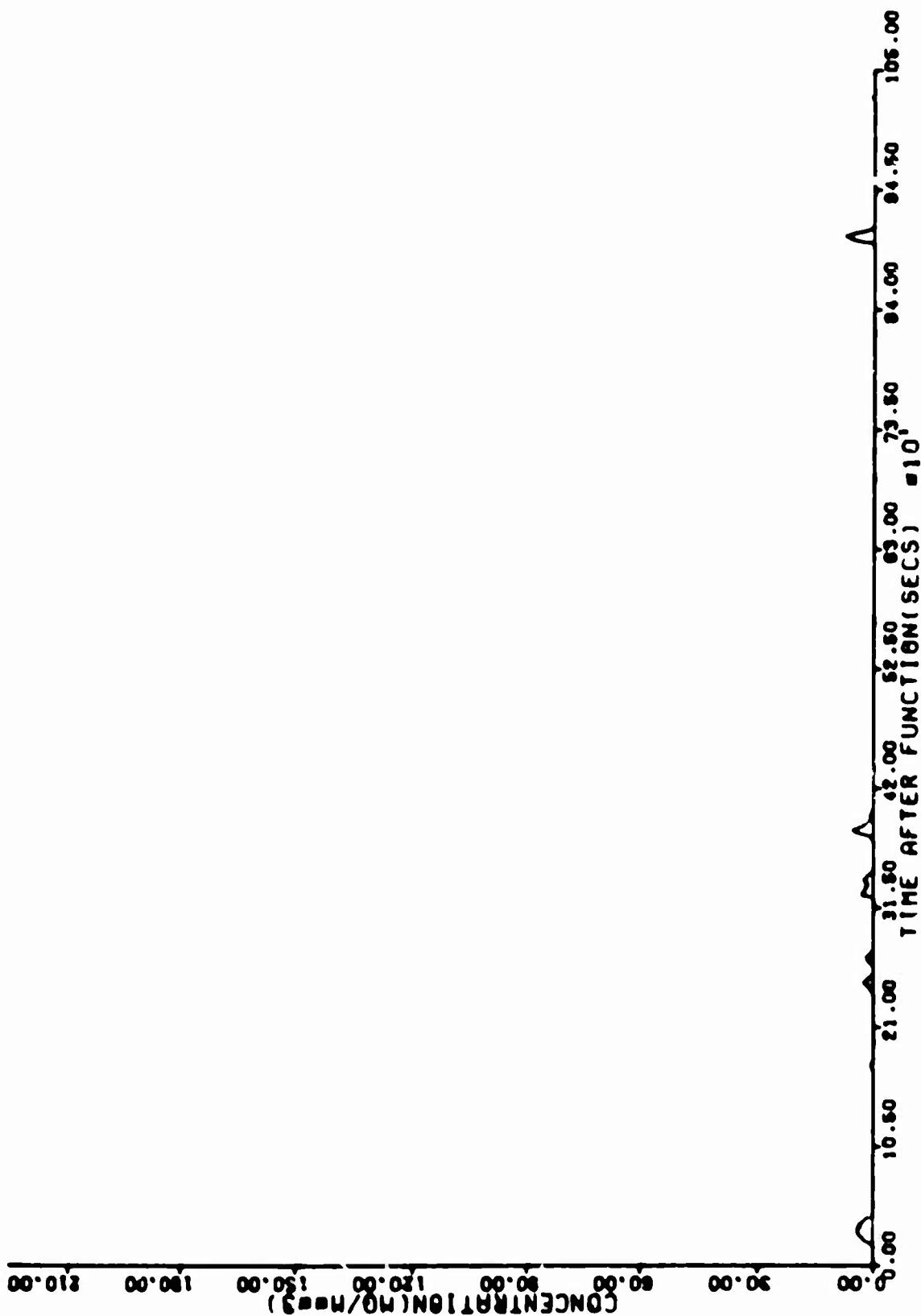
TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

EROSOL PHOTOMETER *10. X=0.00. Y=147.00. Z=0.00



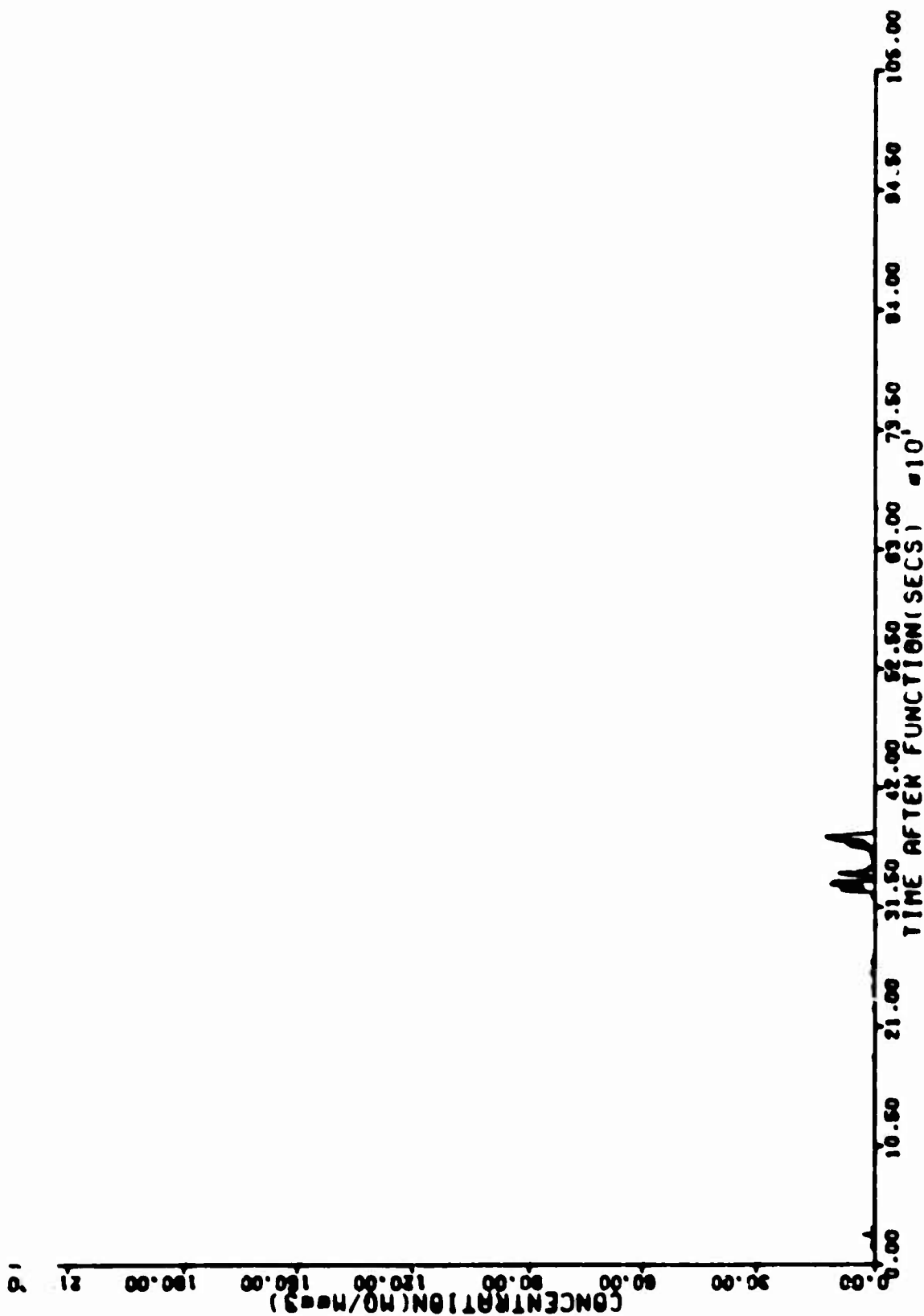
TRIAL 14 'DP-1002). 27 OCT 1977. 13:27:00. WP SMOKE

AEROSOL PHOTOMETER #11. X=0.00. Y=156.00. Z=0.00



TRIAL 14 (DP-1002), 27 OCT 1977, 13:27:00, WP SMOKE

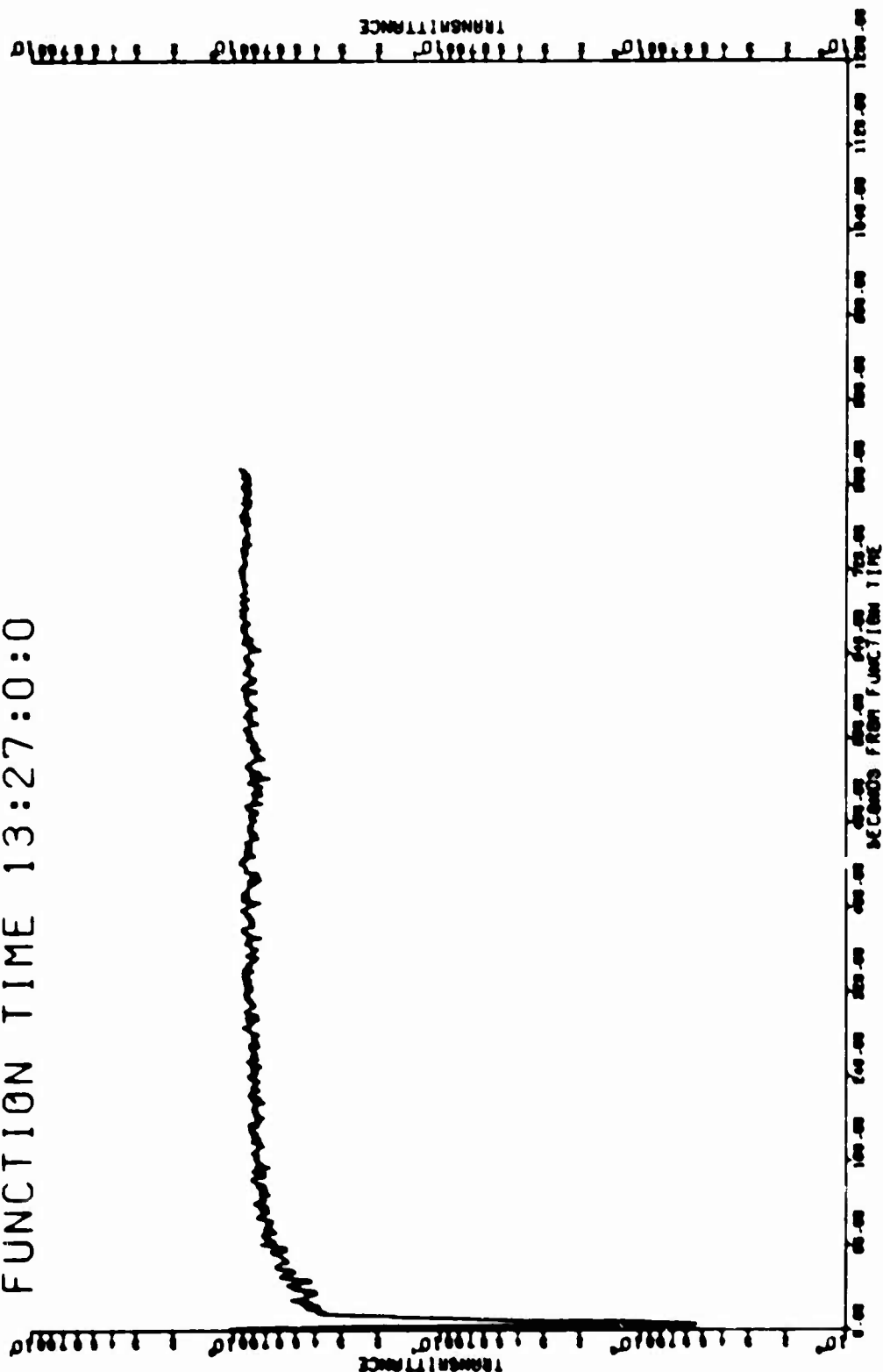
EROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00



TRIAL 14 (DP-1002). 27 OCT 1977. 13:27:00. WP SMOKE

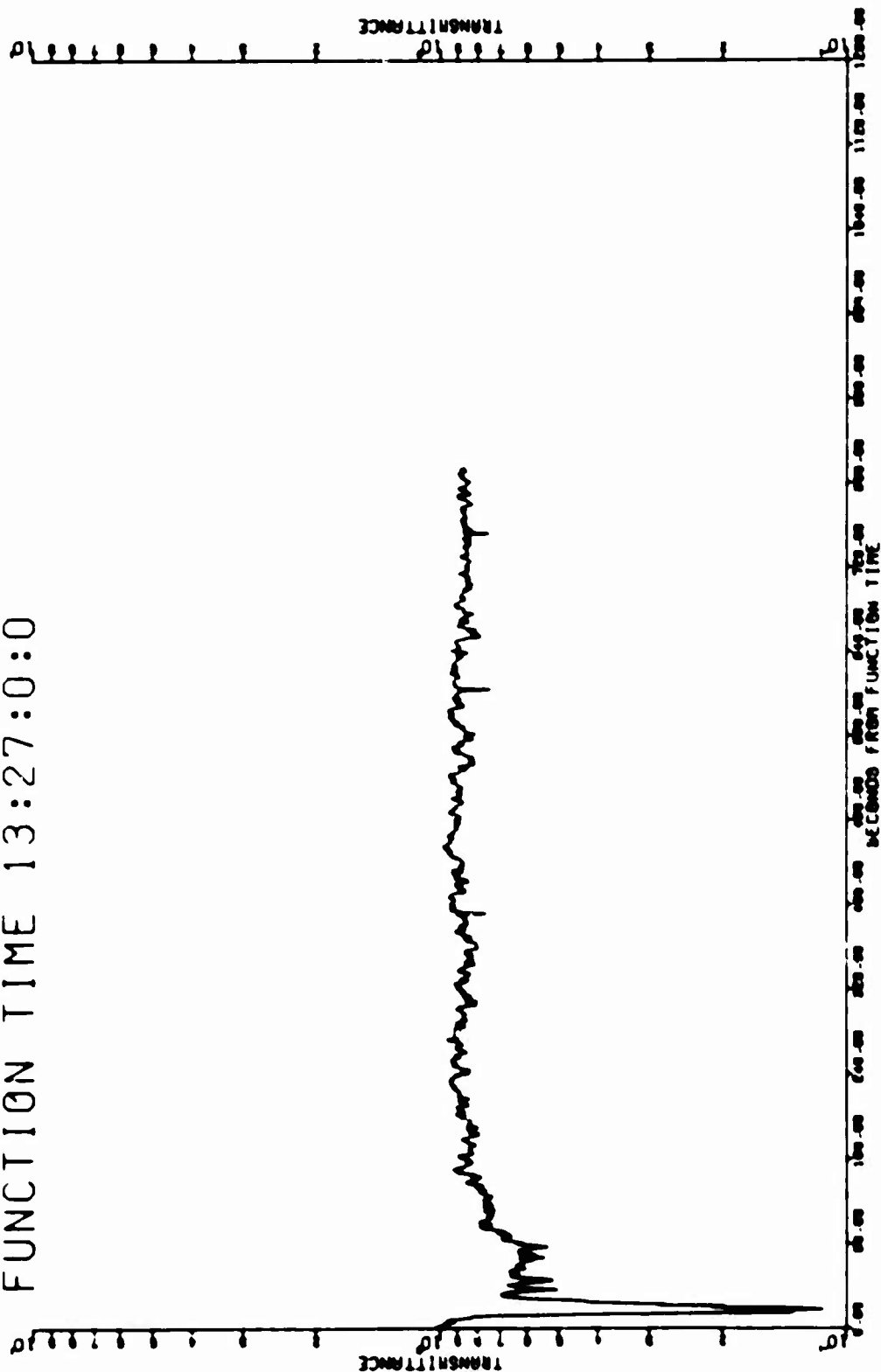
AEROSOL PHOTOMETER #14. X=0.00. Y=183.00. Z=0.00

TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:0:0



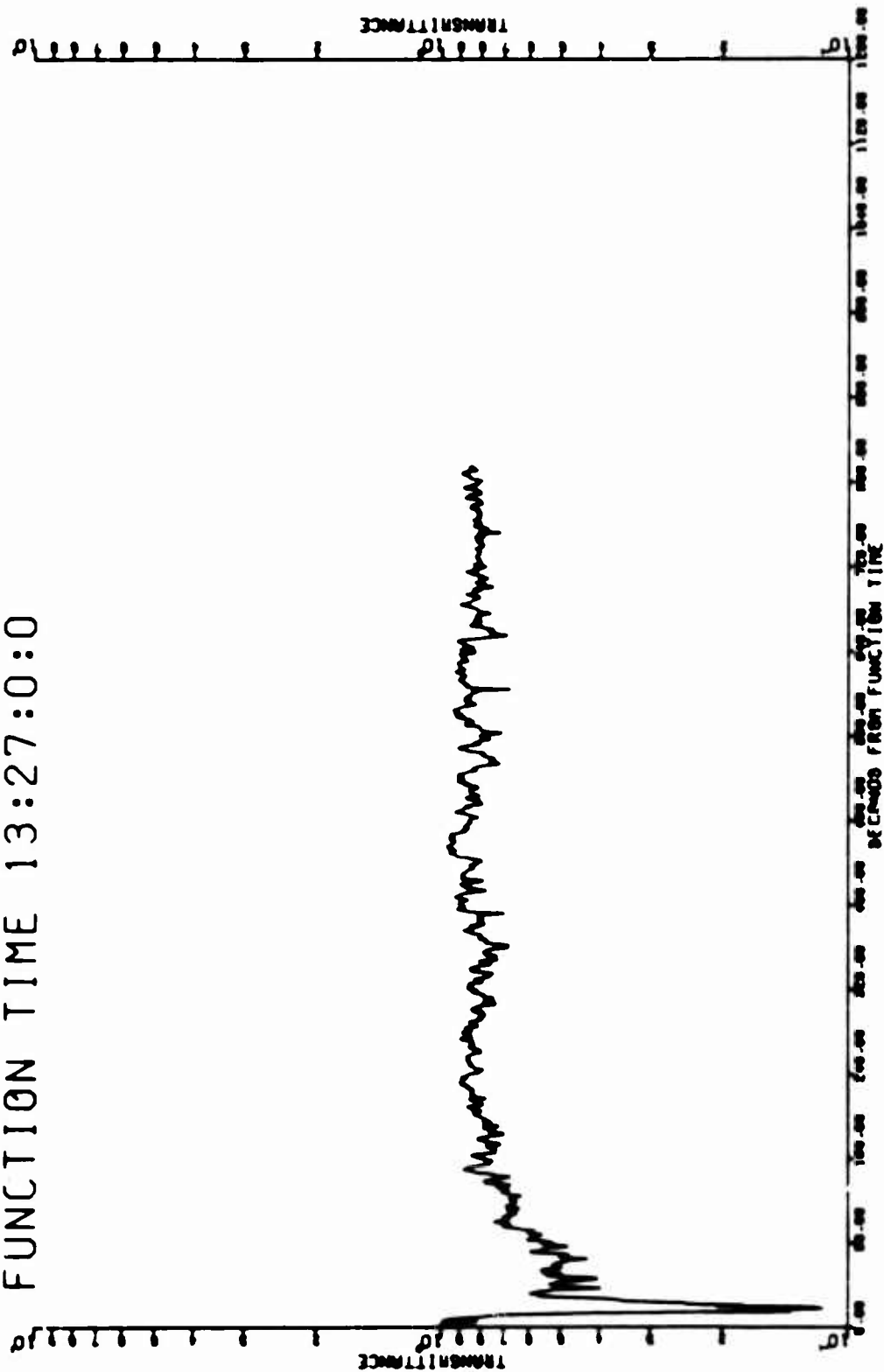
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:0:0



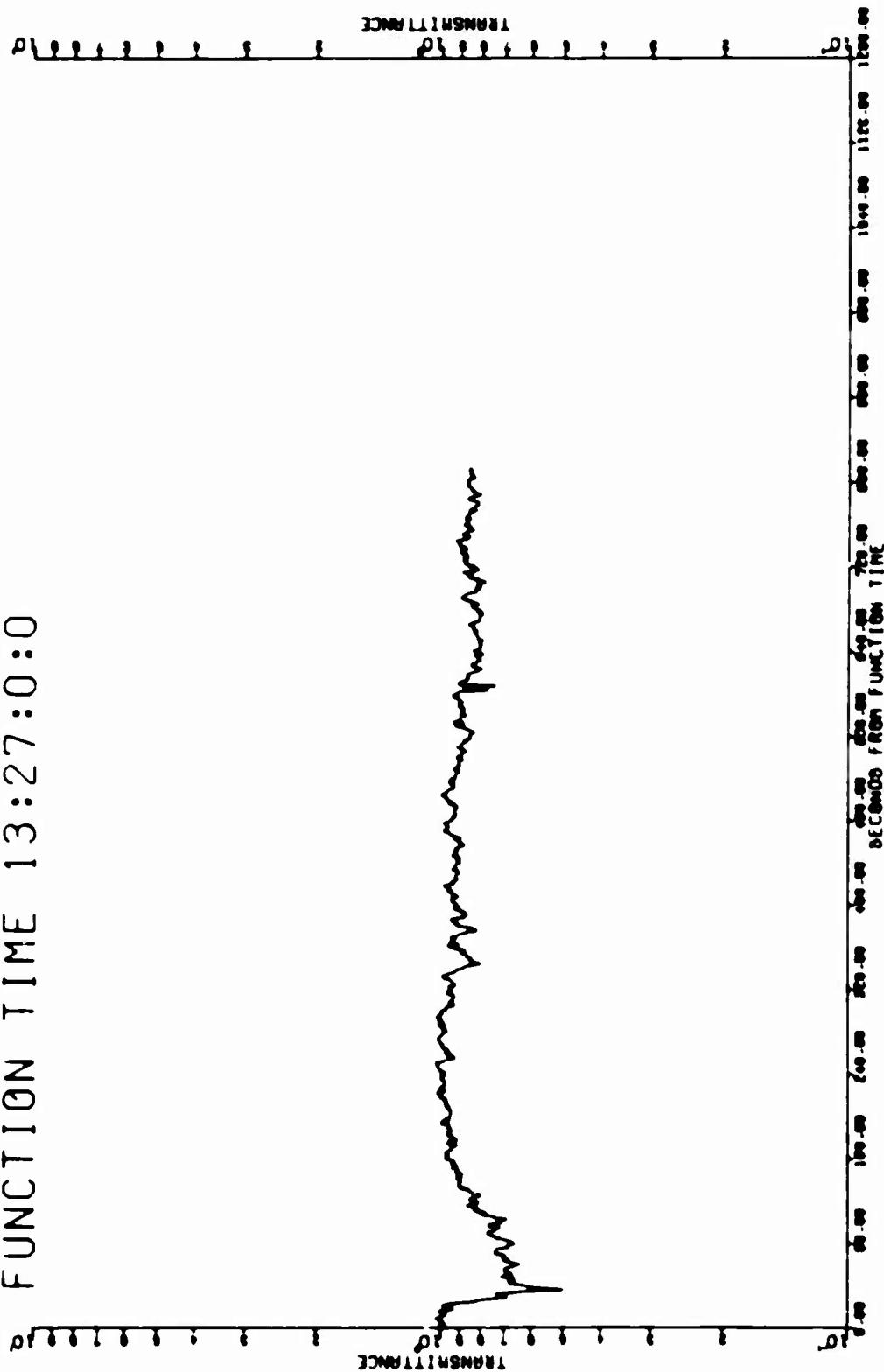
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:0:0



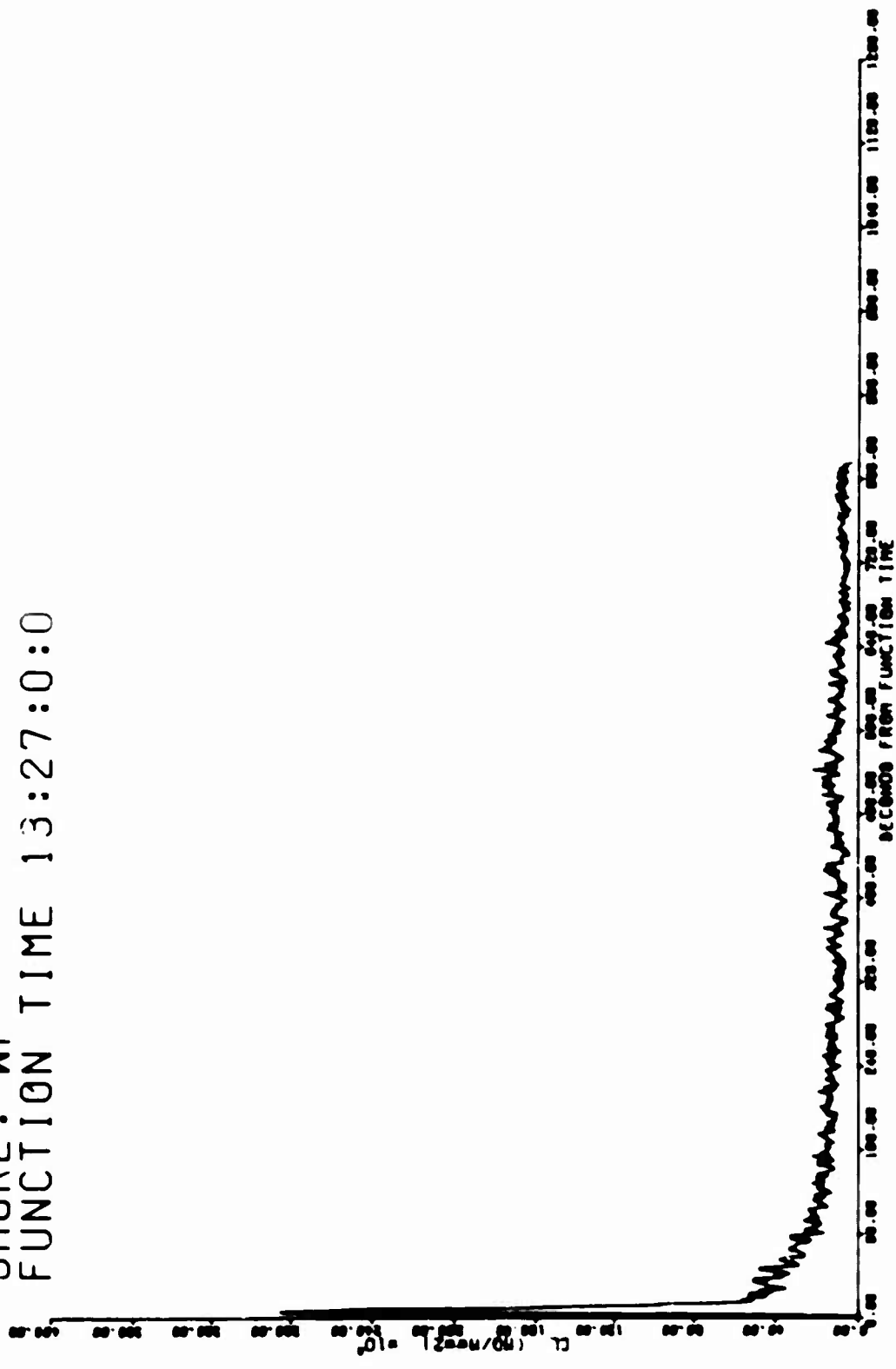
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:0:0



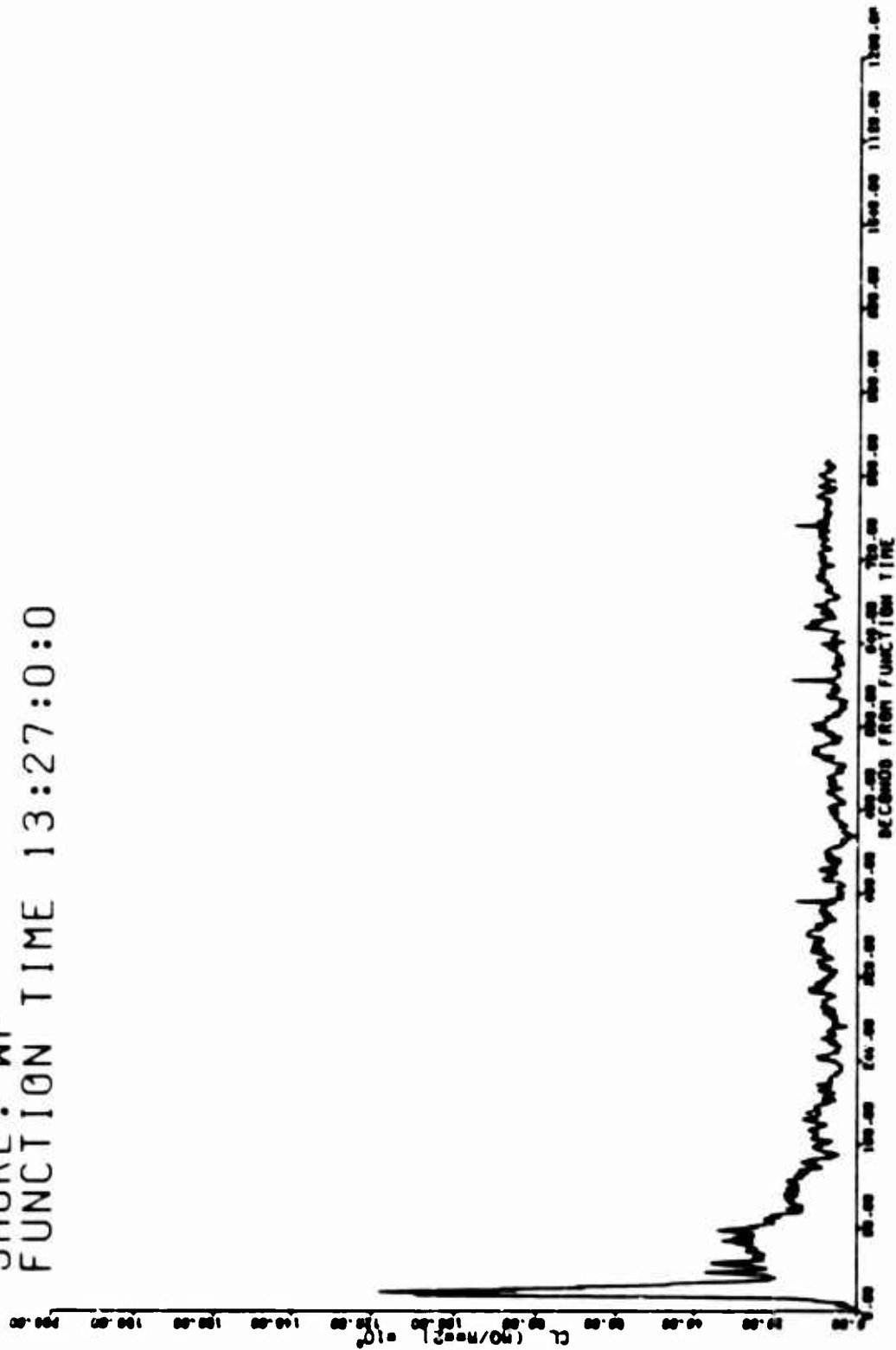
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW 0

TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0



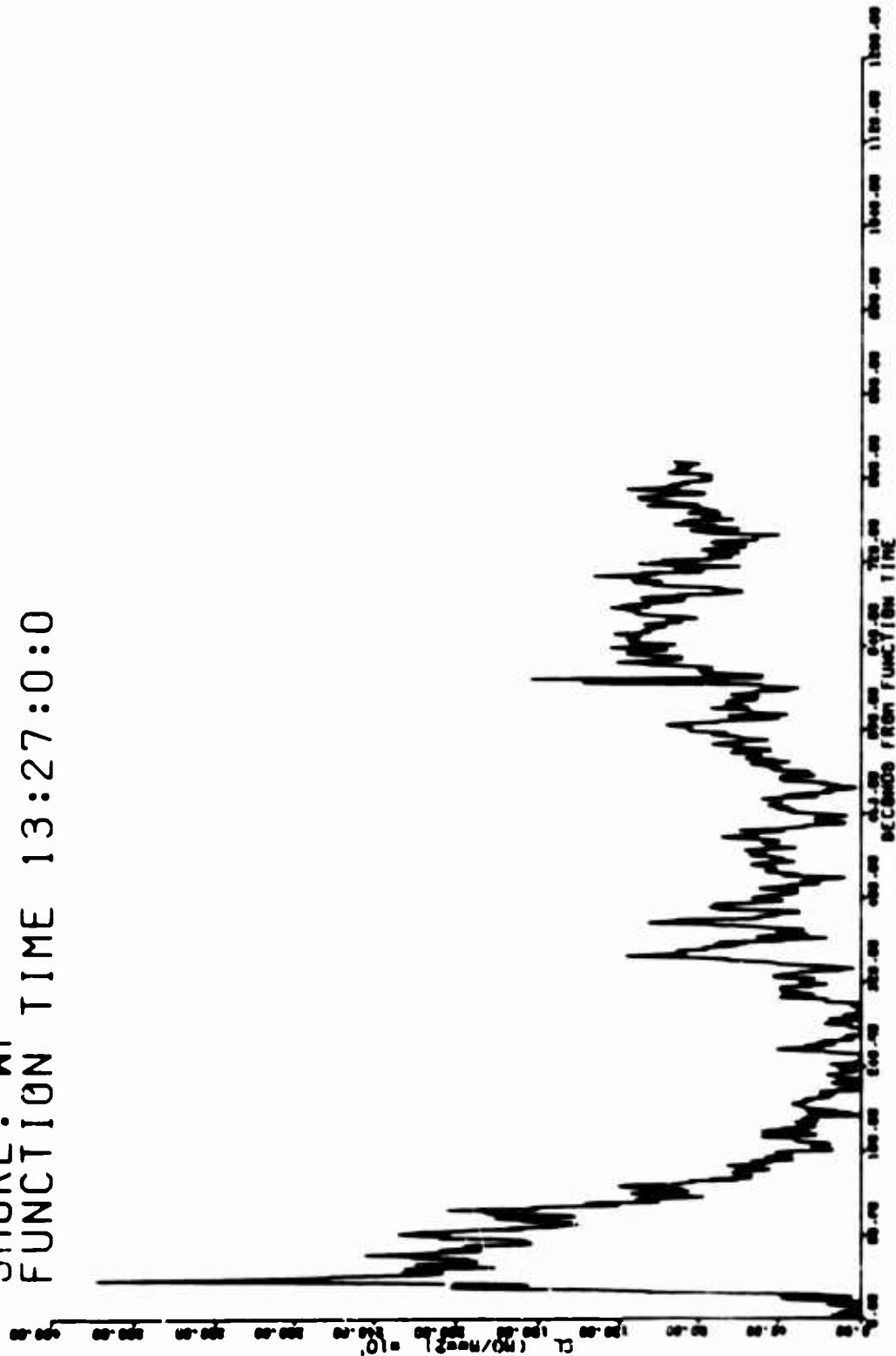
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0



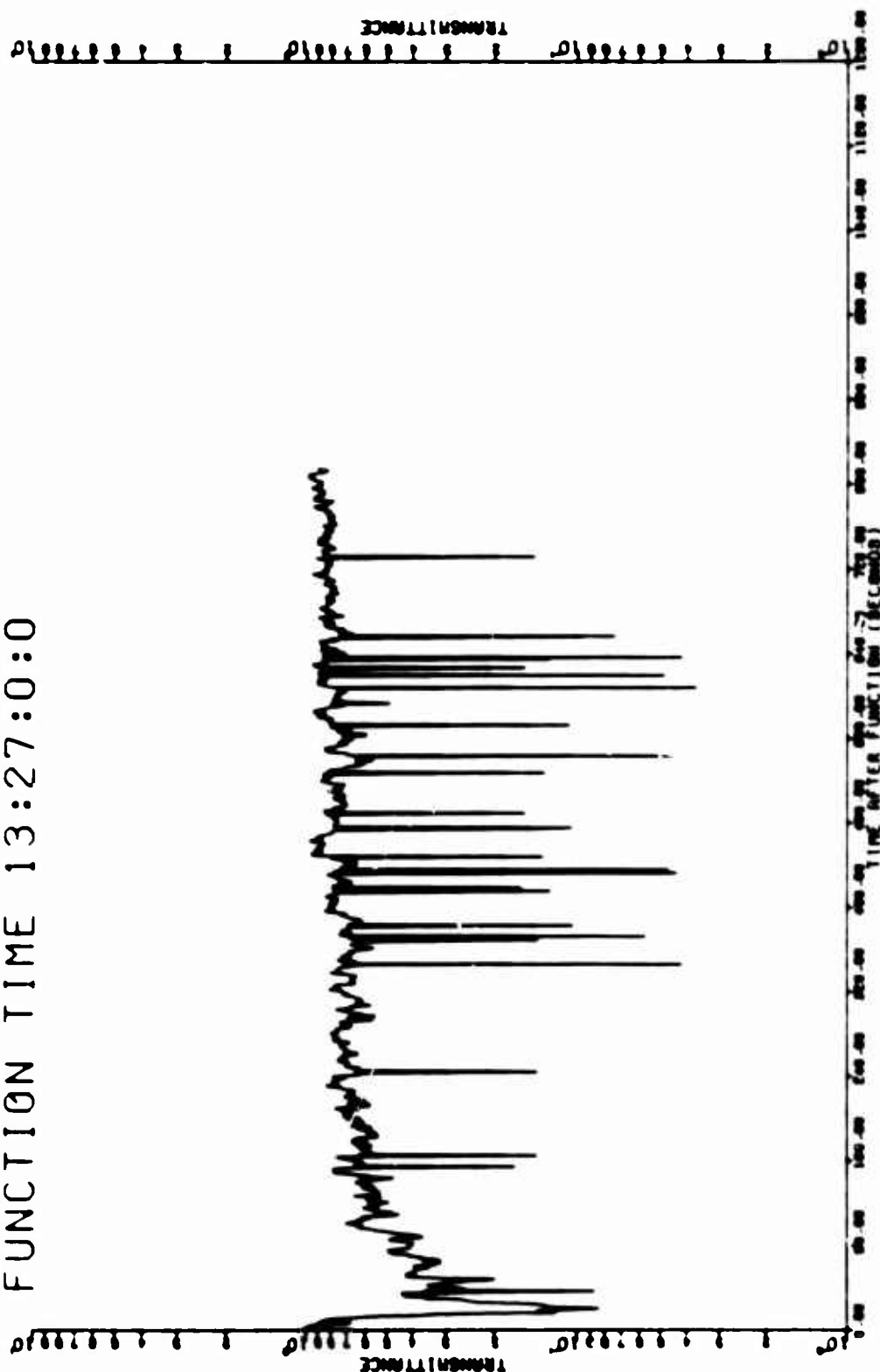
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:00:0



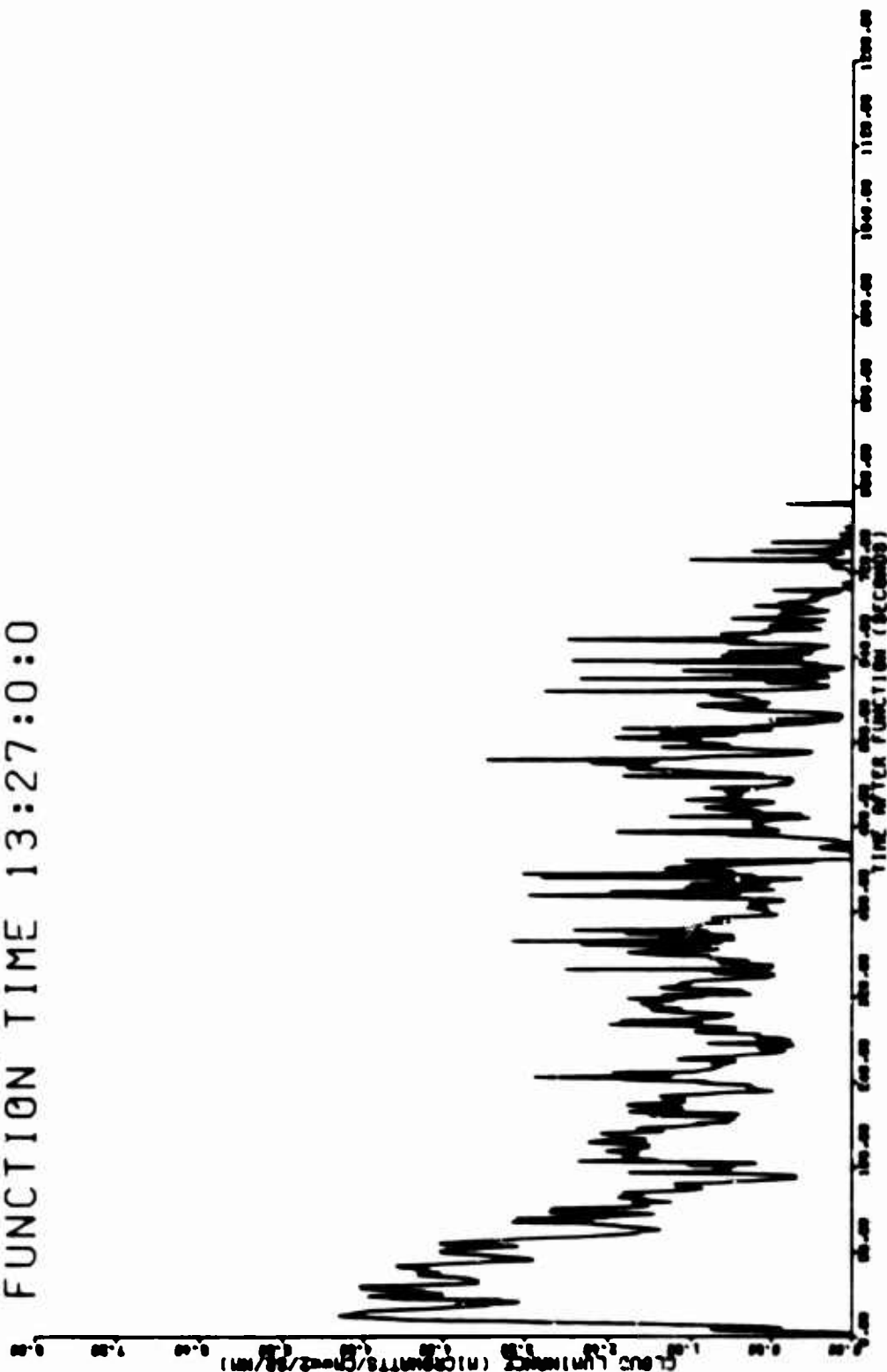
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0



TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0



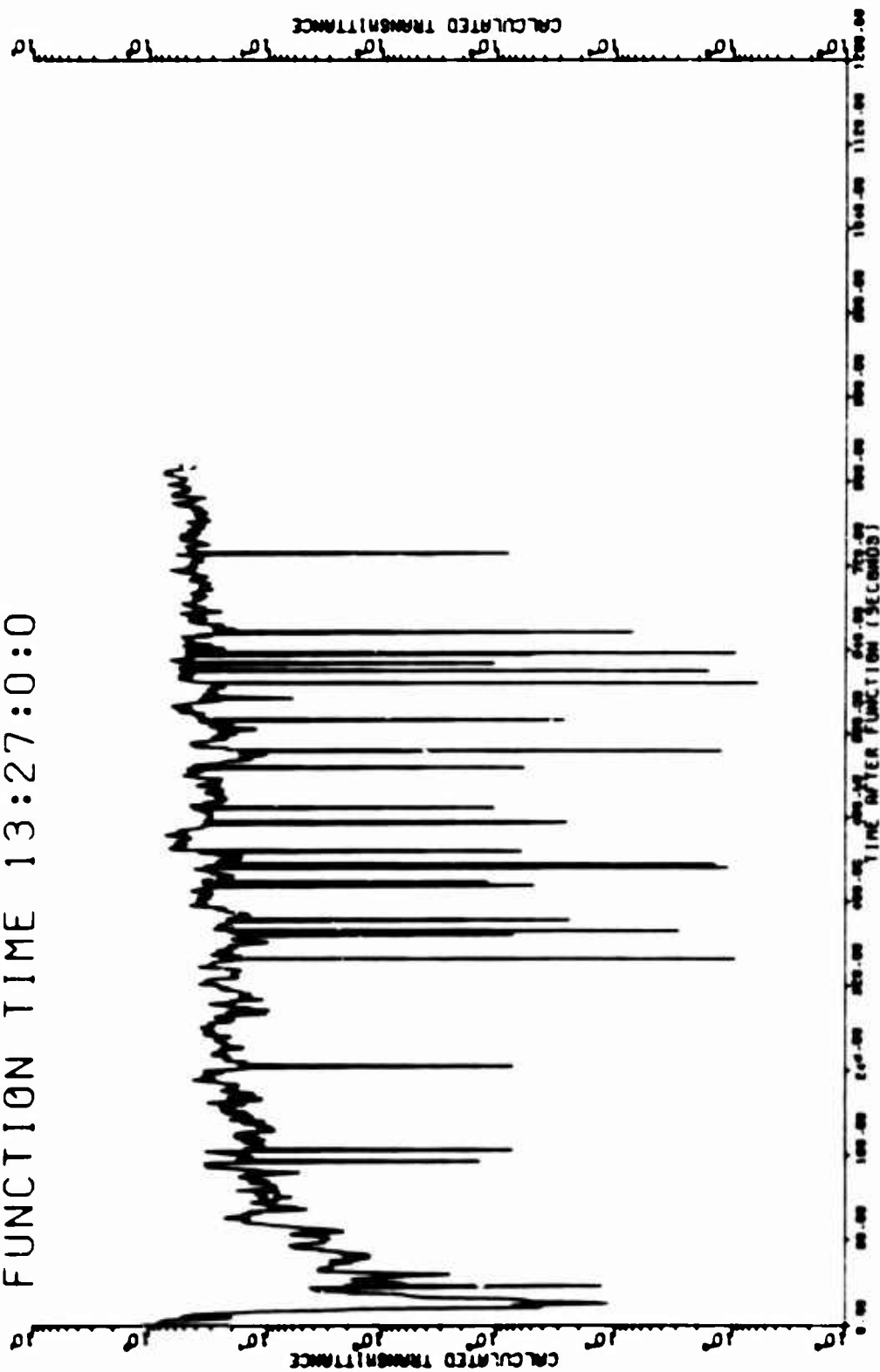
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

IRBL #14 (DP1-002)

DATE: 27 OCT 1977

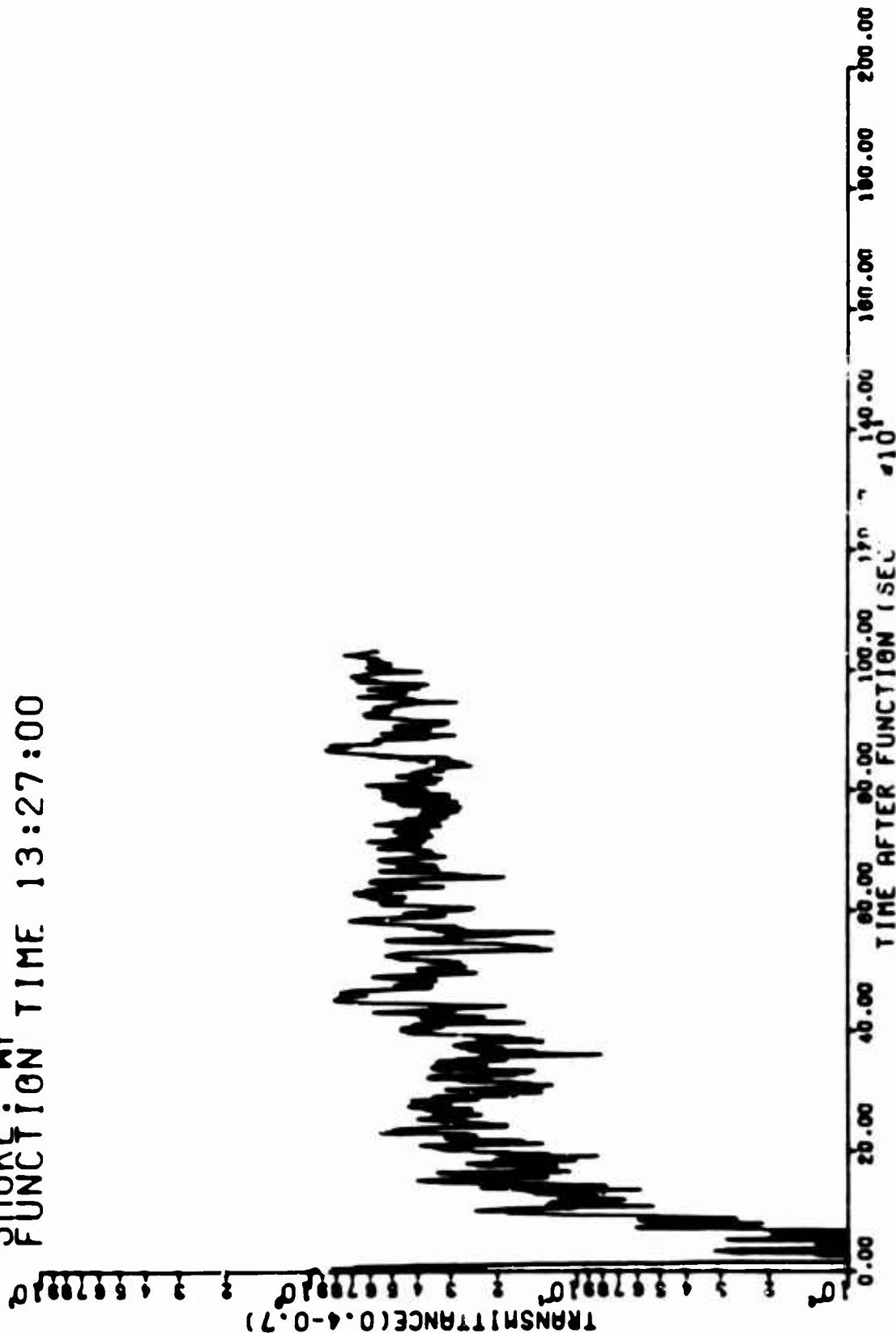
SMOKE: WP

FUNCTION TIME 13:27:0:0



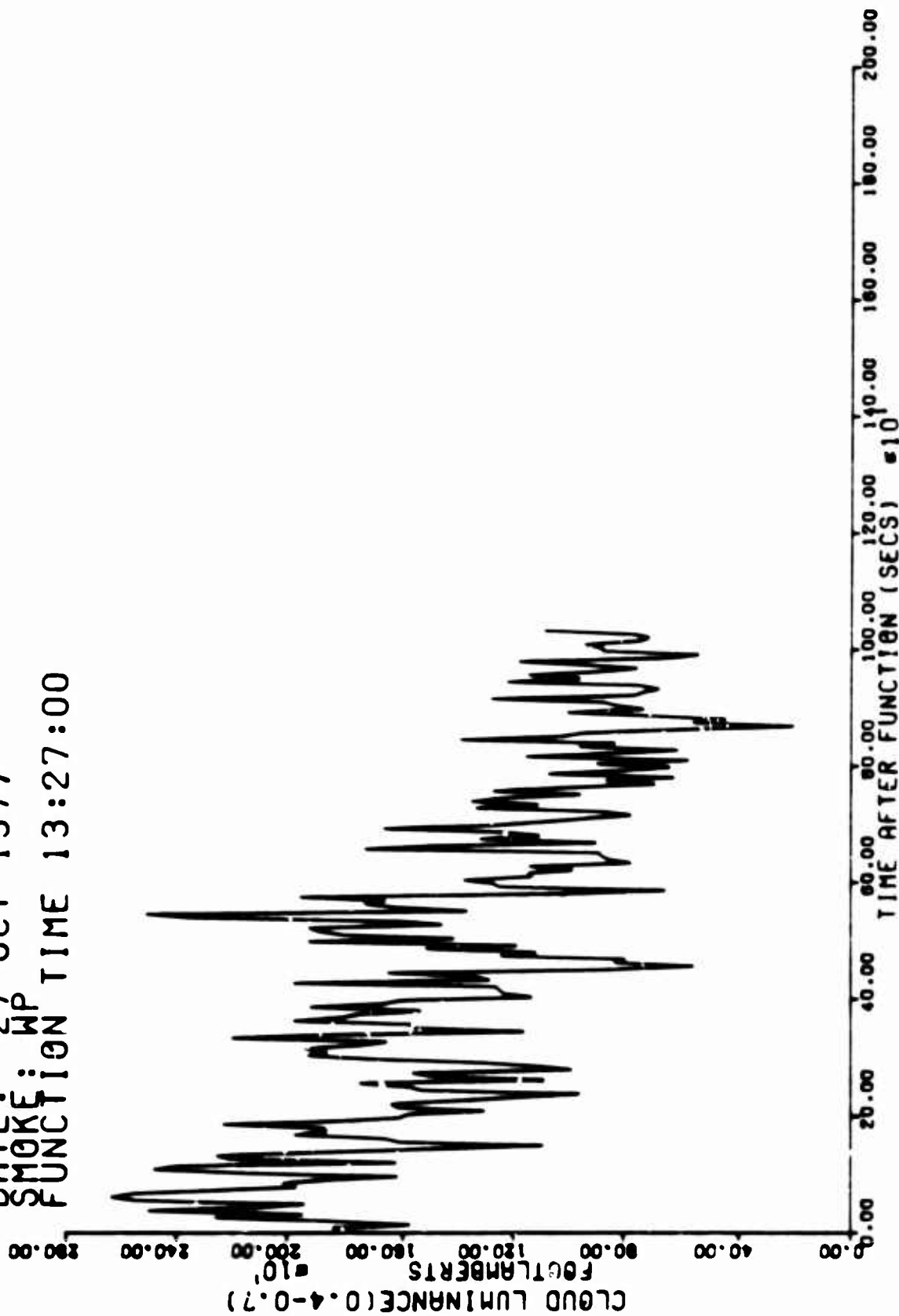
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 14 (DP-1002)
 DATE: 27 Oct 1977
 SMOKE: WP
 FUNCTION TIME 13:27:00



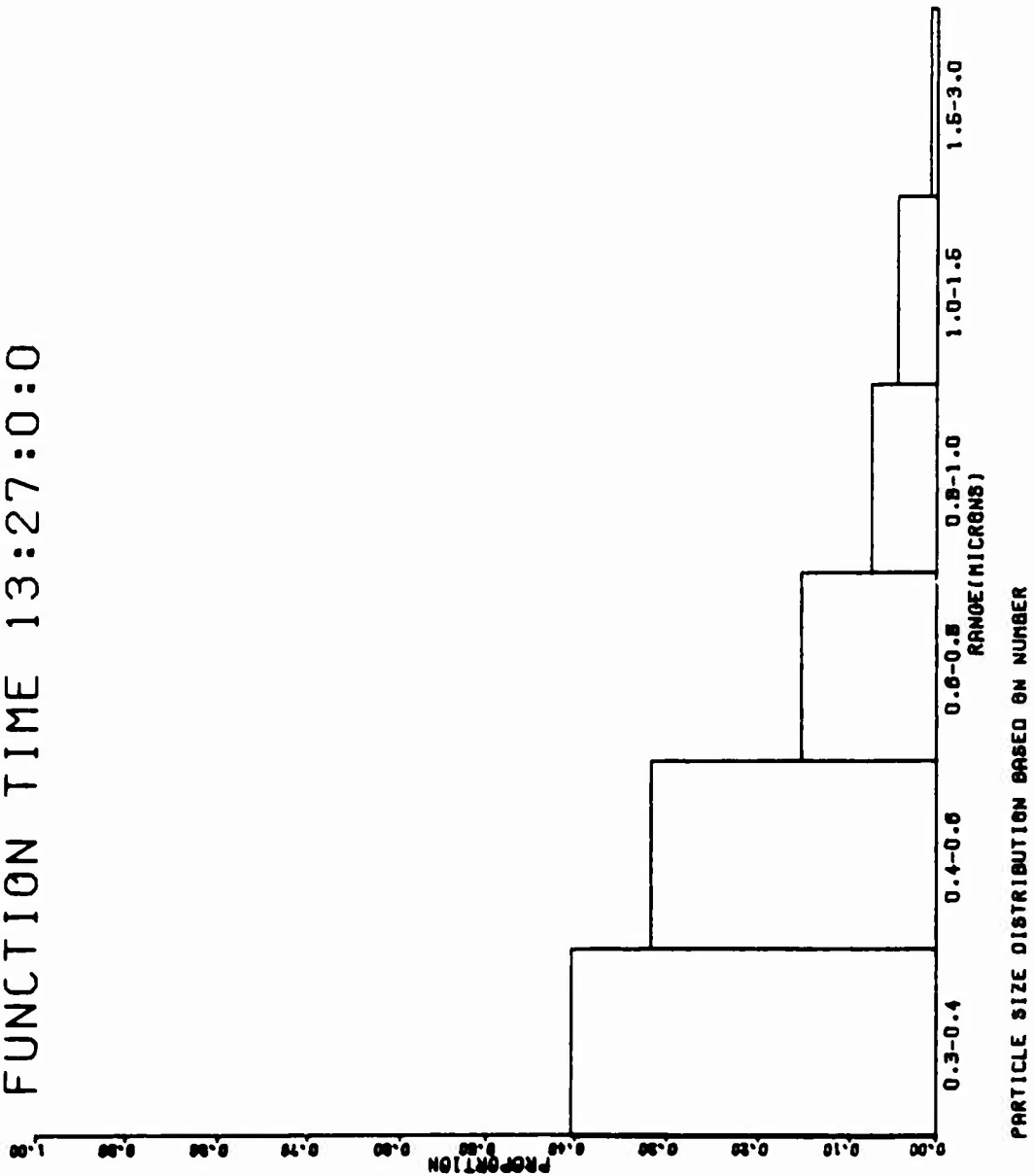
TRANSMITTANCE VS TIME FOR WAVELENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED USING ROW Q

TRIAL 14 (DP-1602)
 DATE: 27 Oct 1977
 SMOKE: WP
 FUNCTION TIME 13:27:00

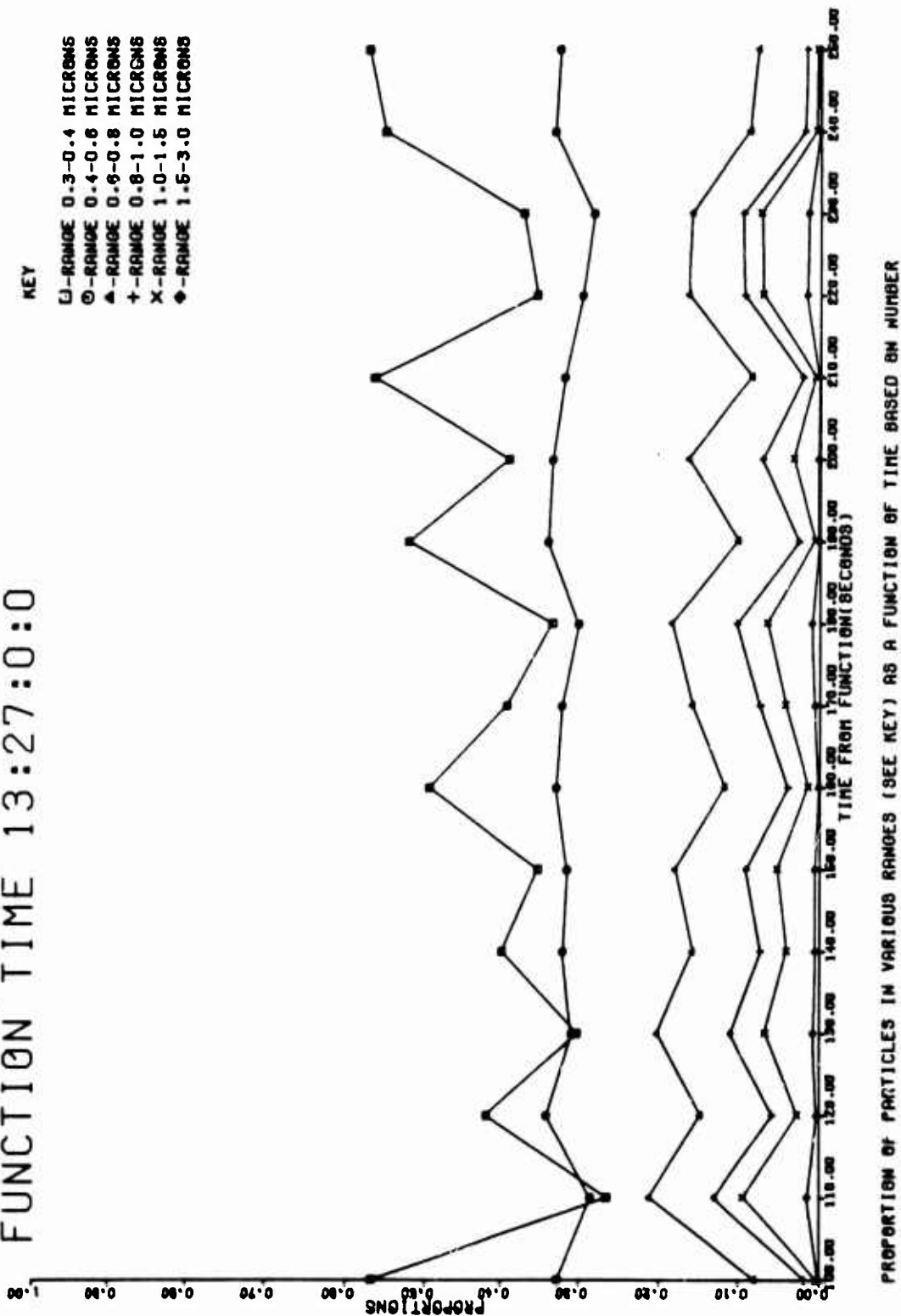


CLOUD LUMINANCE VS. TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

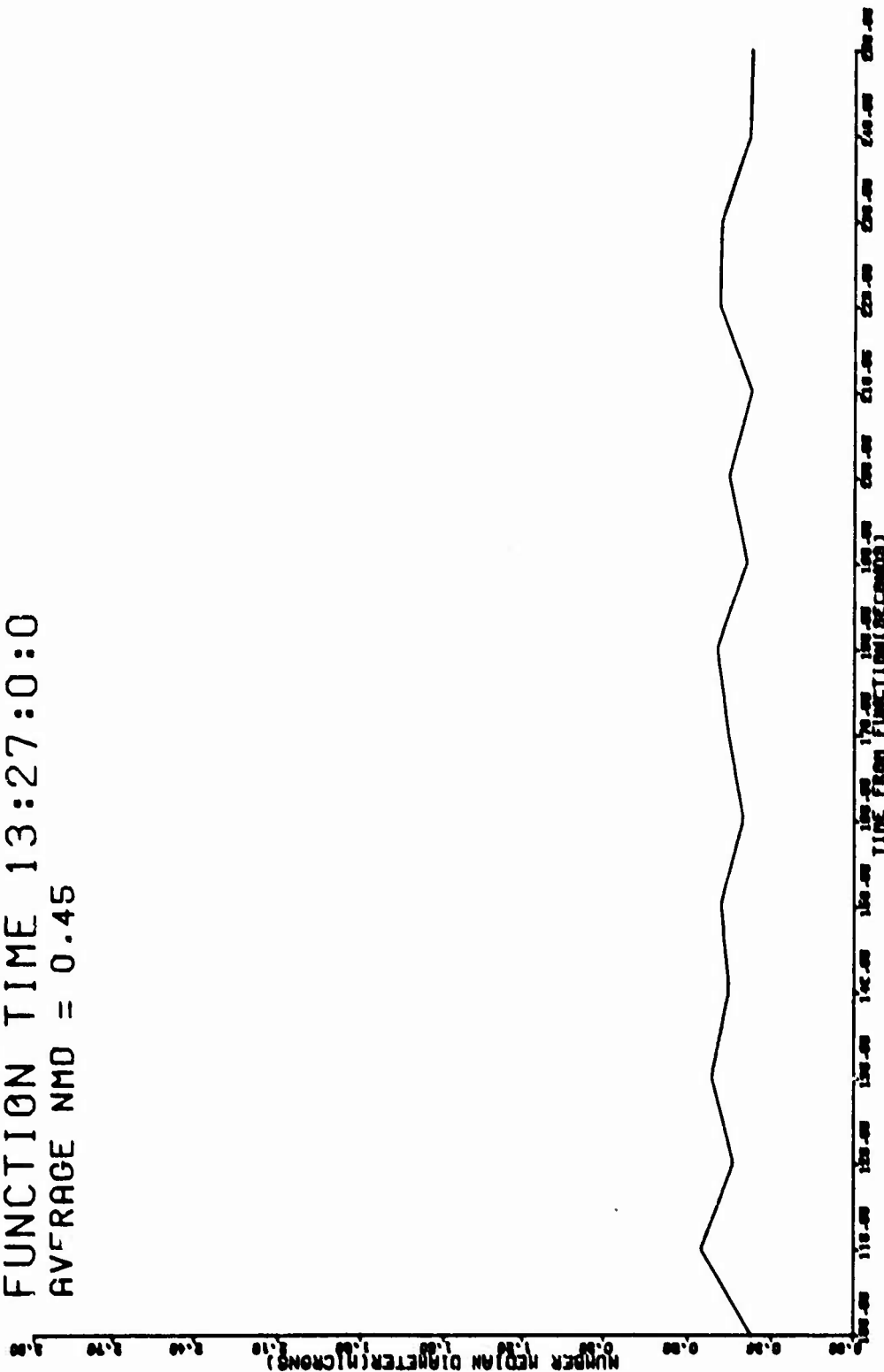
TRIAL #14 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 13:27:0:0



TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0



TRIAL #14 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:27:0:0
 AVERAGE NMD = 0.45



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-10

TRIAL DP1-002-T-15 (WP SMOKE) 26 OCT 1977

SUMMARY OF TEST DATA	B-I-10-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-10-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-10-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-10-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-10-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-10-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-10-22
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-10-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-10-24
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-10-25
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-10-26
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-10-27
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-10-28
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-10-29
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-10-30

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-10-31
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-10-32
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-10-33
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-10-34

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #15

Date: 26 Oct 77

Time: 1213:00 MDT

Wind Direction (Transport) (degrees) (4m)	172
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.8
Temperature at 2-meters, Trial Time (T, °C)	23.6
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	9.8
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	6.5
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.08
Pasquill Stability Category	B
Relative Humidity (percent) (2m)	19.0
Solar Azimuth (deg)	161.0
Solar Altitude (deg)	35.2
Air Density - ρ (kg m ⁻³)	1.016
Solar Radiation (Langley's per minute)	0.903
Barometric Pressure (millibars)	867.6
Visibility (km)	137
Reflectivity, OD Target	0.26
Haze (footlamberts)	33
Brightness, Background (footlamberts)	900
Brightness, White Target (footlamberts)	1211
Brightness, OD Target	350
Percent Opaque Cloud Cover	0

Munitions/Submunitions Used (PWP, 4.2 inch)	8
Number of Munitions/Submunitions Functioned	8
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.35
(0.4 - 0.6) . . . . .	.32
(0.6 - 0.8) . . . . .	.18
(0.8 - 1.0) . . . . .	.08
(1.0 - 1.5) . . . . .	.06
(1.5 - 3.0) . . . . .	.00
$\text{Log}_{10} \text{NMD}$	-.32046
$^{\sigma} \text{Log}_{10} \text{NMD}$ . . . . .	.20579
NMD . . . . .	.48
MMD . . . . .	.60

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1213:00*	4	11	4
1213:10	34	63	11
1213:20	56	108	12
1213:30	103	125	8
1213:40	158	127	9
1213:50	184	116	10
1214:00	221	103	14
1214:10	227	101	14
1214:20	196	100	14
1214:30	183	98	26
1214:40	183	111	24
1214:50	197	116	19
1215:00	205	118	16

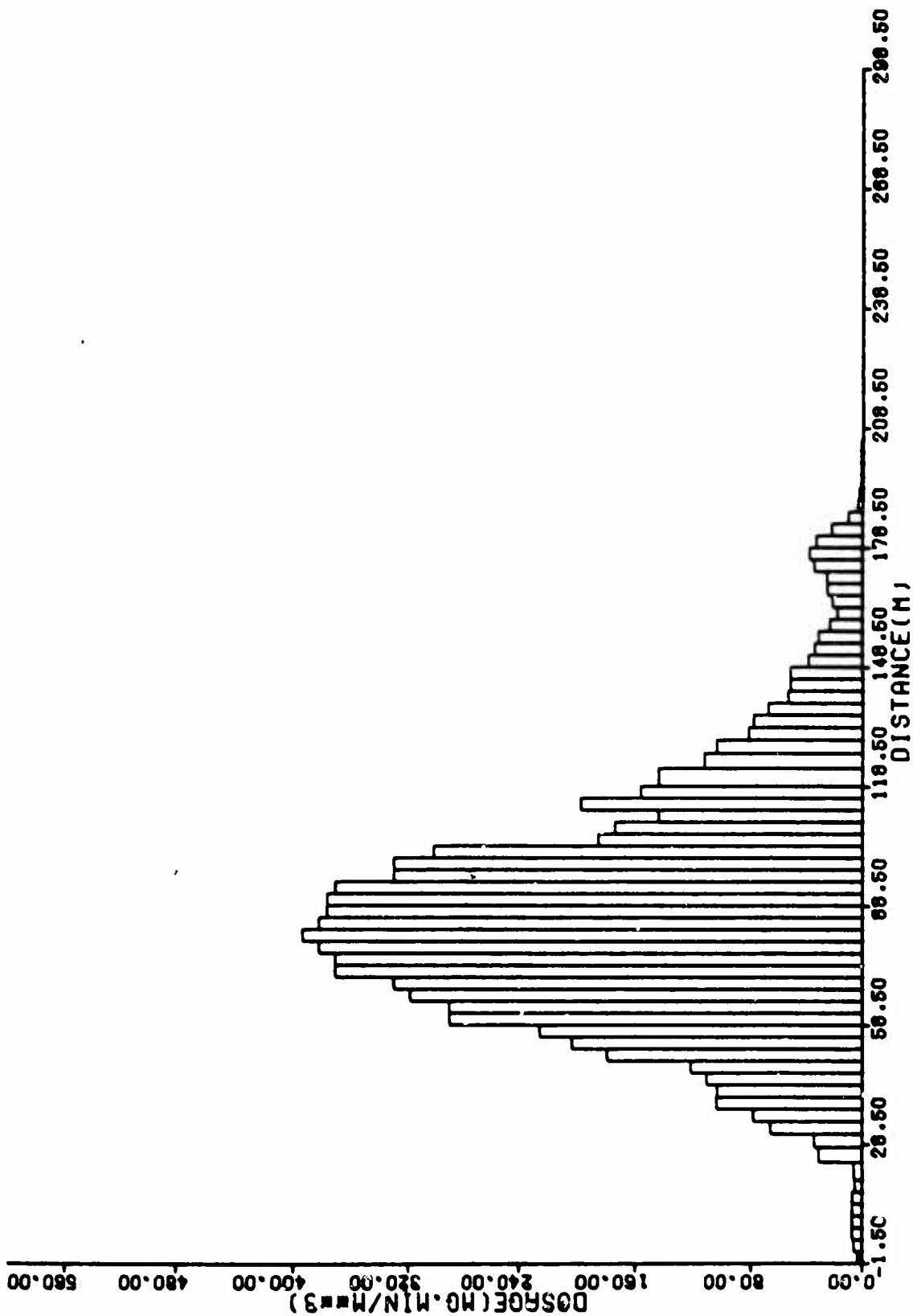
*Munitions were not fuzed properly and resulted in slow burning. It is very likely that all the munitions were not ignited at the instant this picture was taken.

SKY BRIGHTNESS

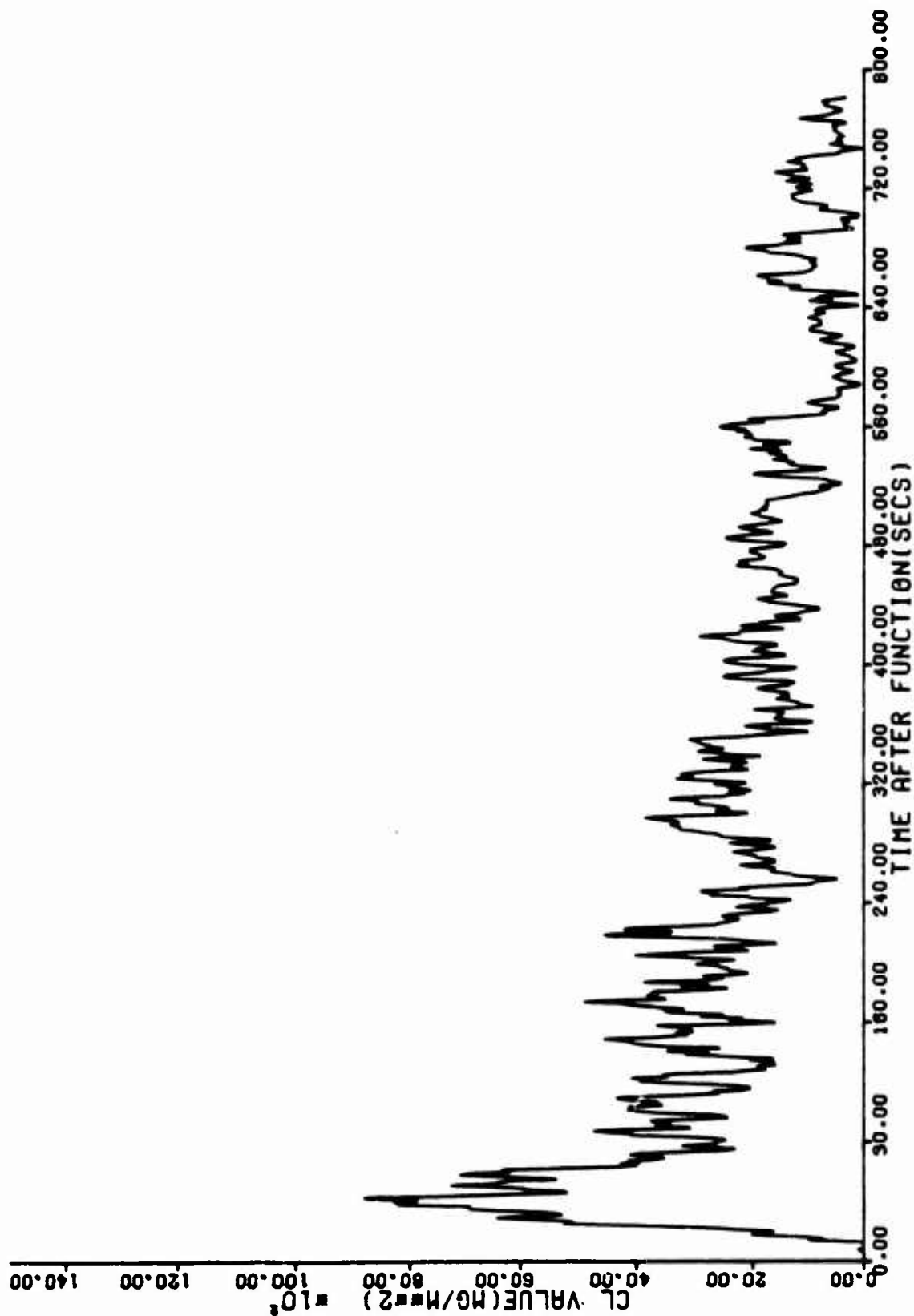
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	ND
5	ND
10	ND
15	ND
20	ND
25	ND
30	ND
35	ND
40	ND
45	ND

Viewing azimuth 240° except 255° at 0 degrees elevation

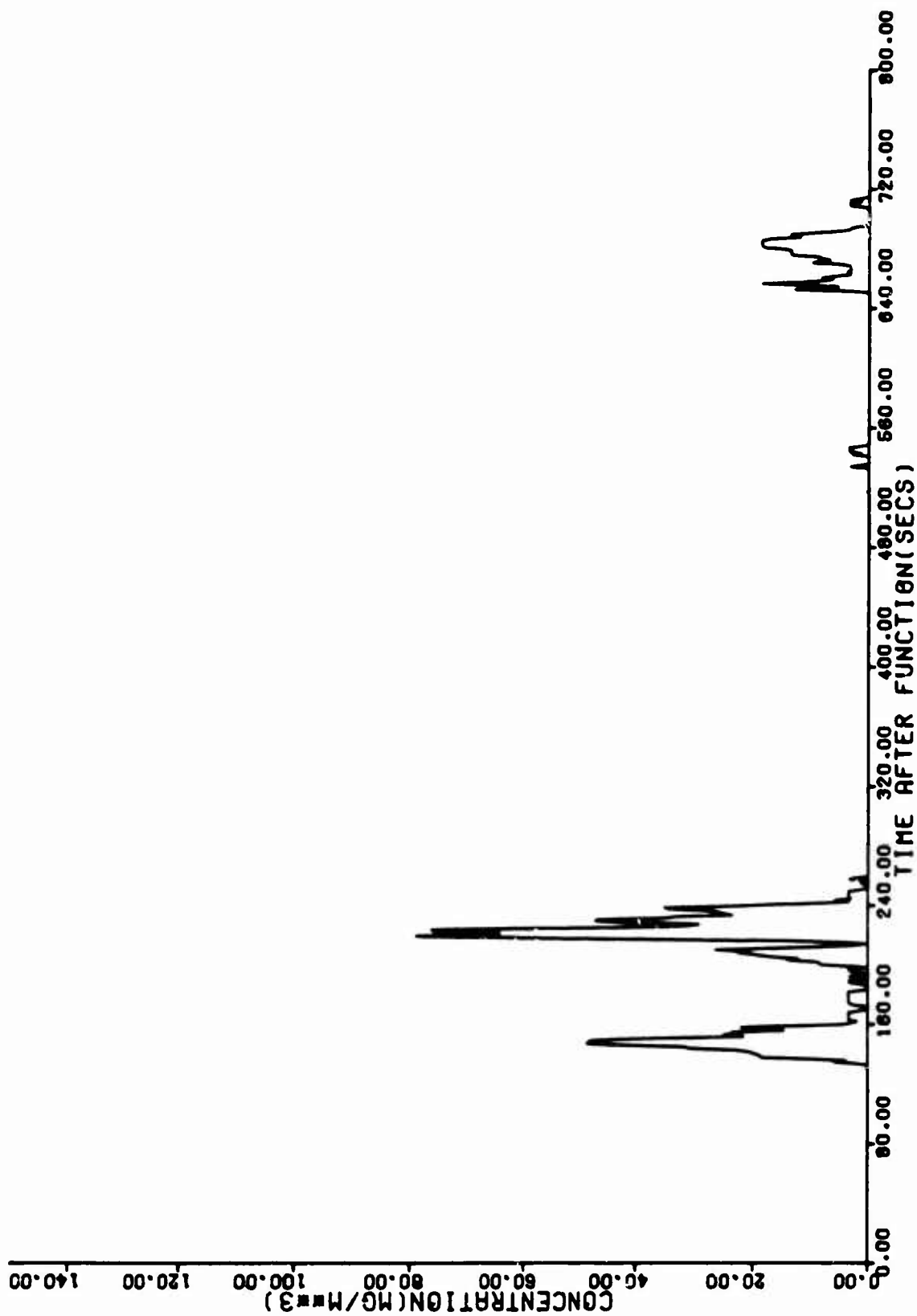


TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE



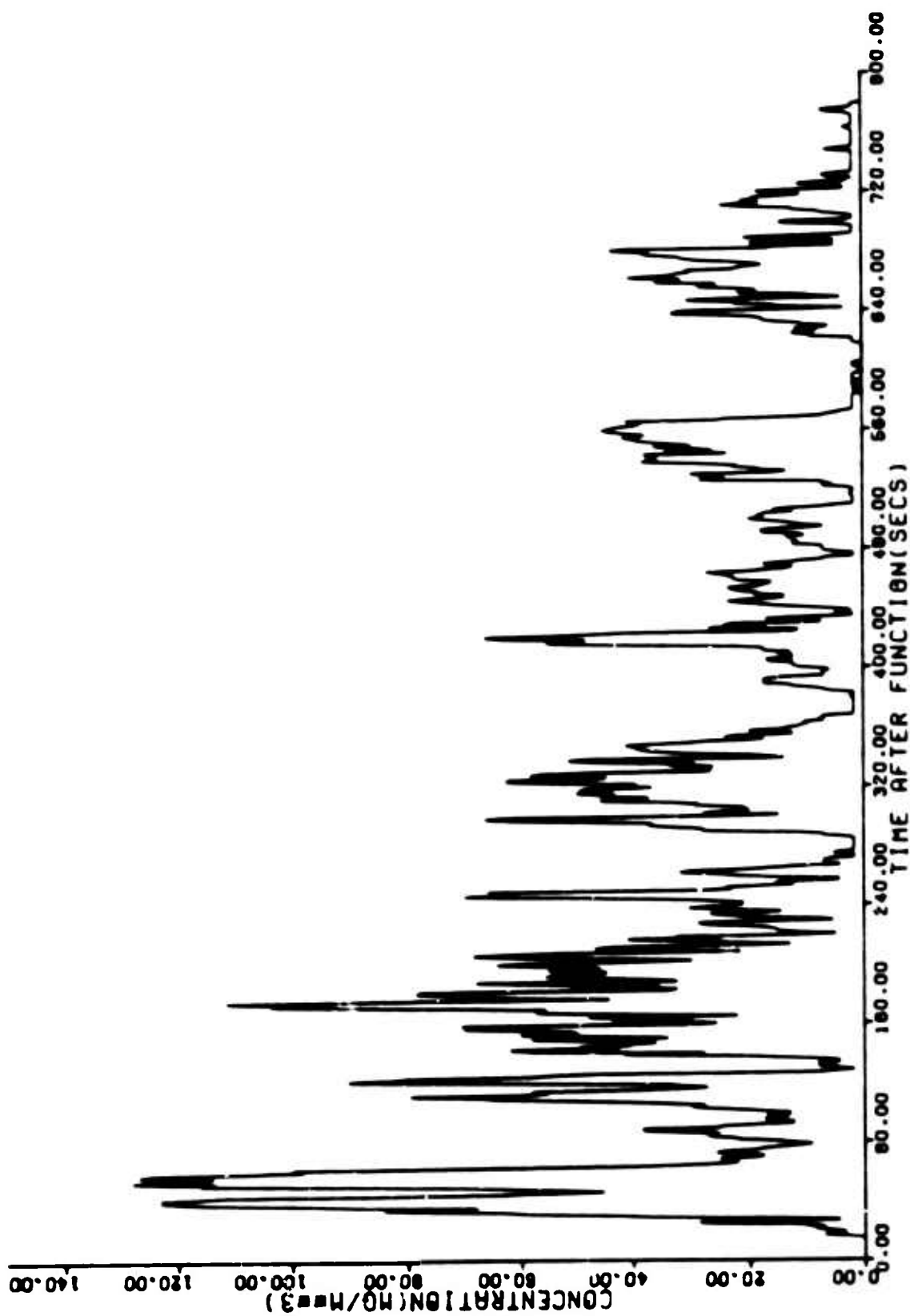
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



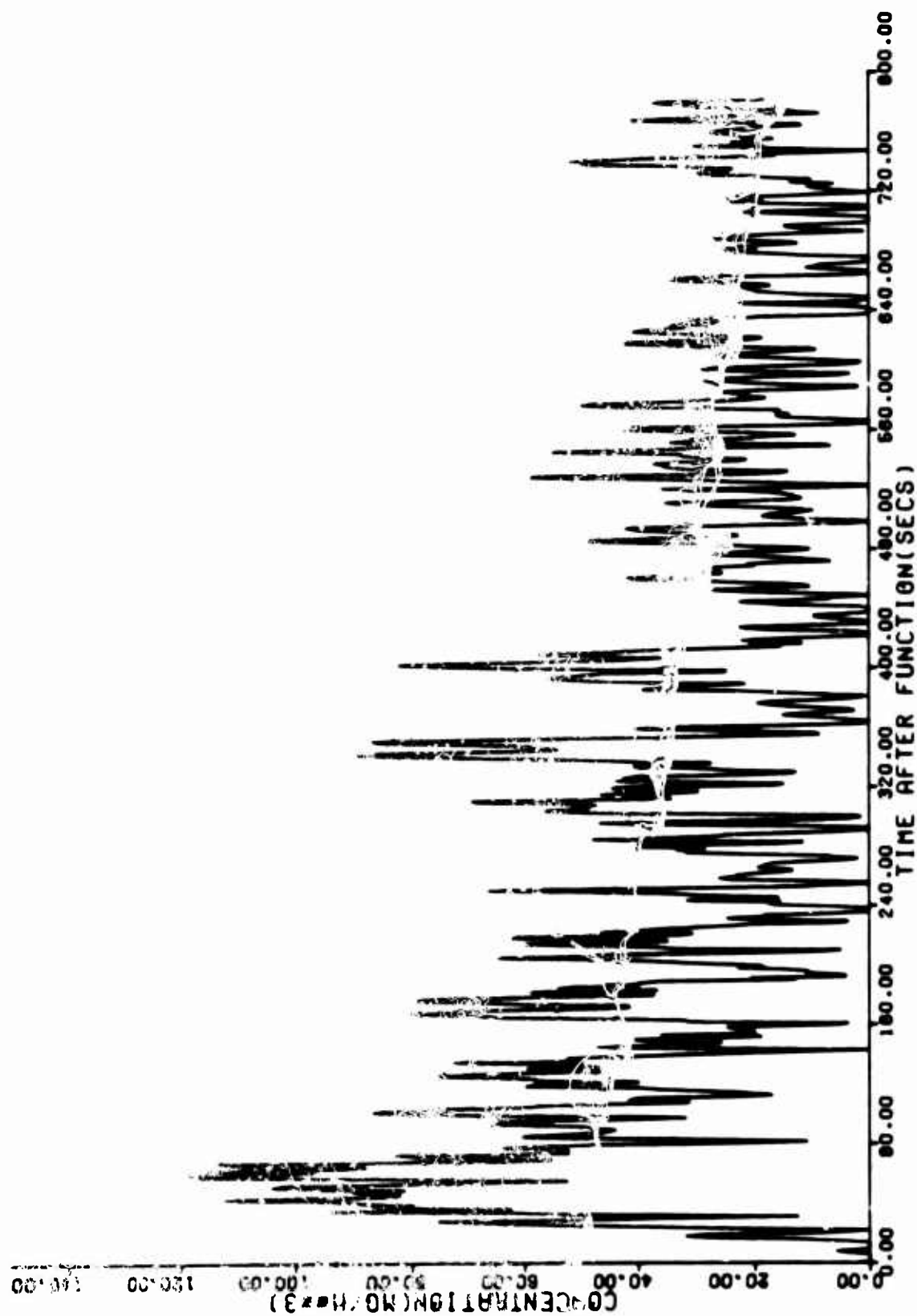
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

AEROSOL PHOTOMETER #2, X=0.00, Y=30.00, Z=0.00



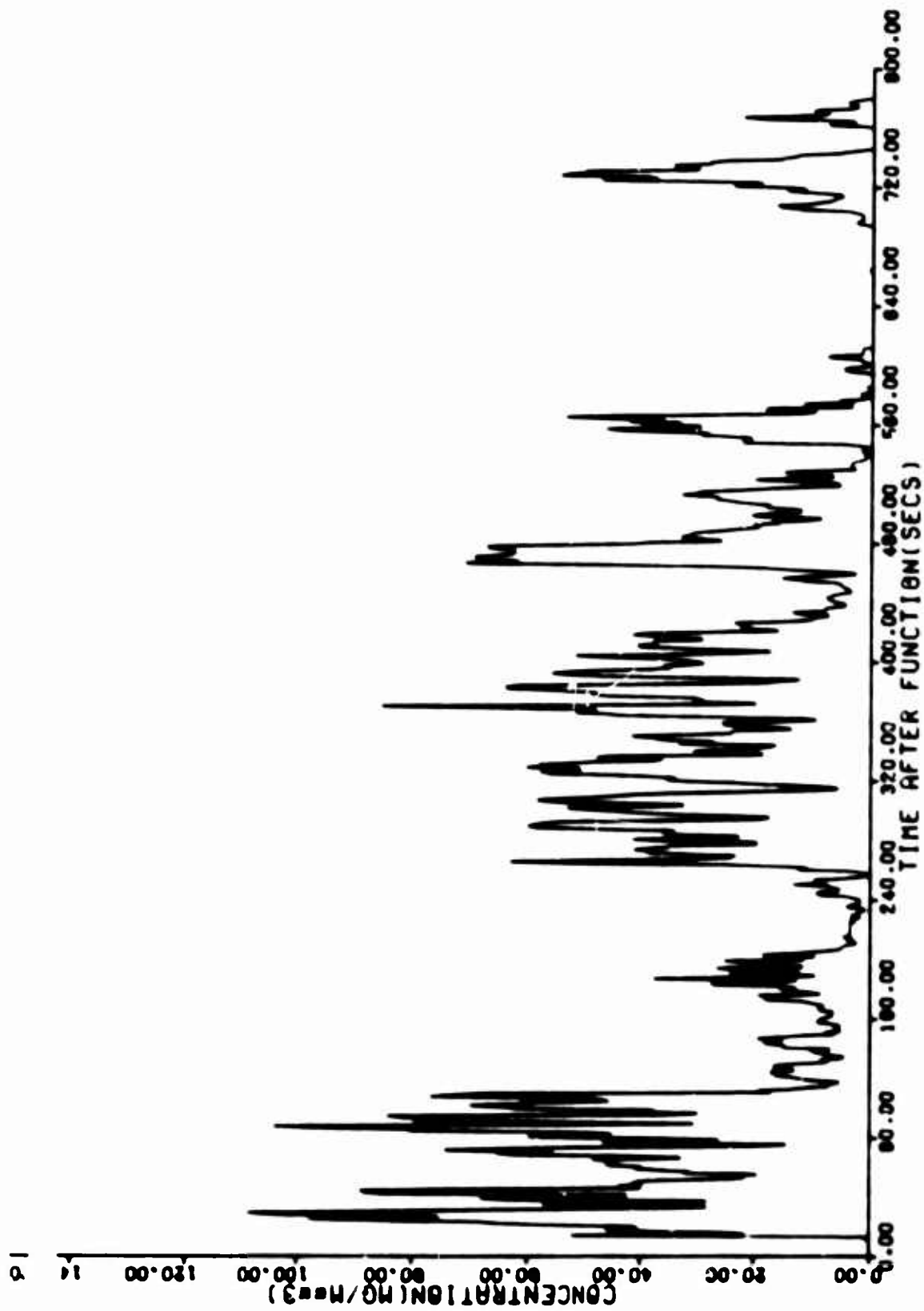
TRIAL 15 (DP-1002). 26 OCT 1977. 12:13:00. WP SMOKE

AEROSOL PHOTOMETER #4. X=0.00. Y=66.00. Z=0.00



TRIAL 15 (DP-1002). 26 OCT 1977, 12:13:00, WP SMOKE

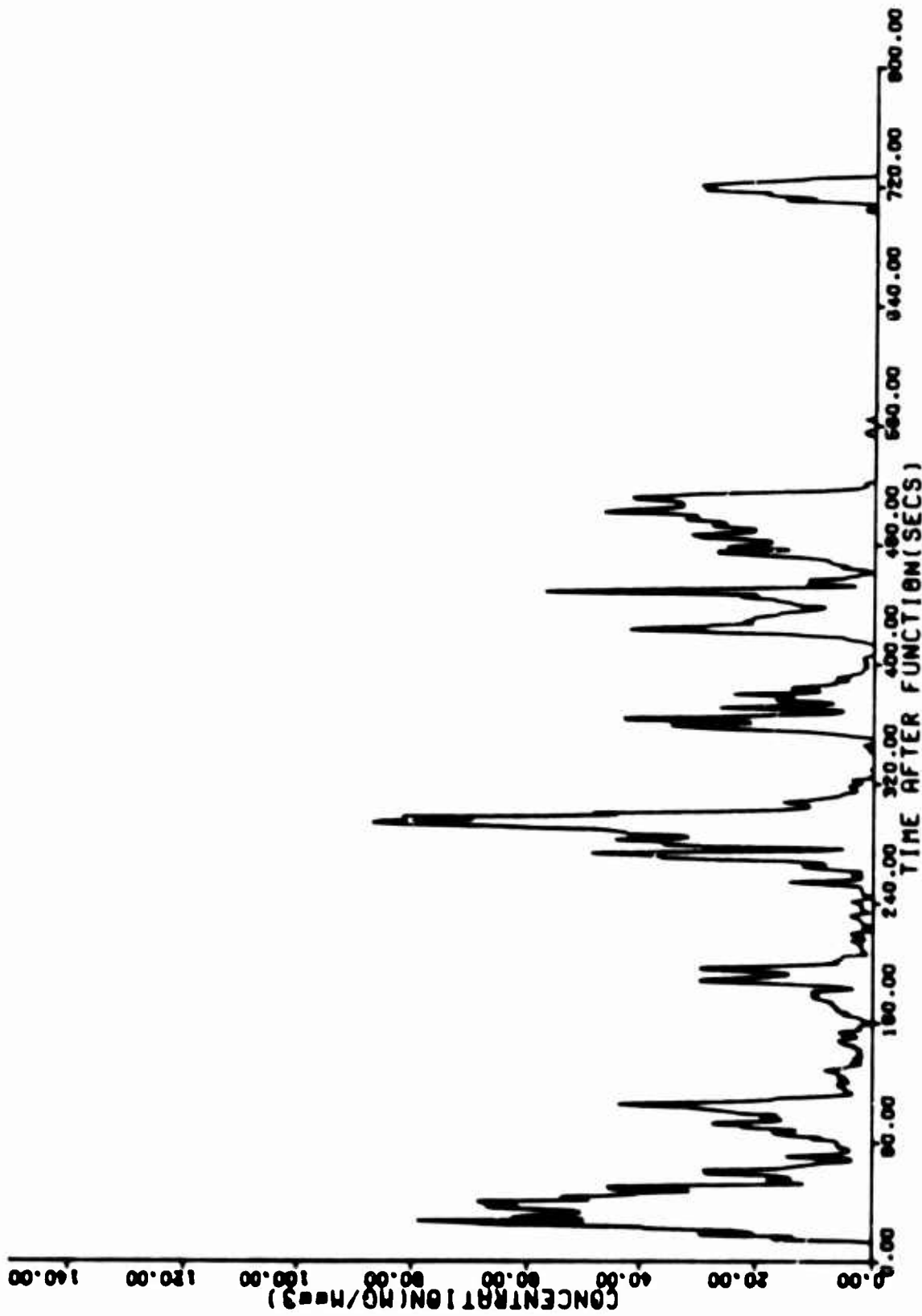
AEROSOL PHOTOMETER #5, X=0.00, Y=84.00, Z=0.00



TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

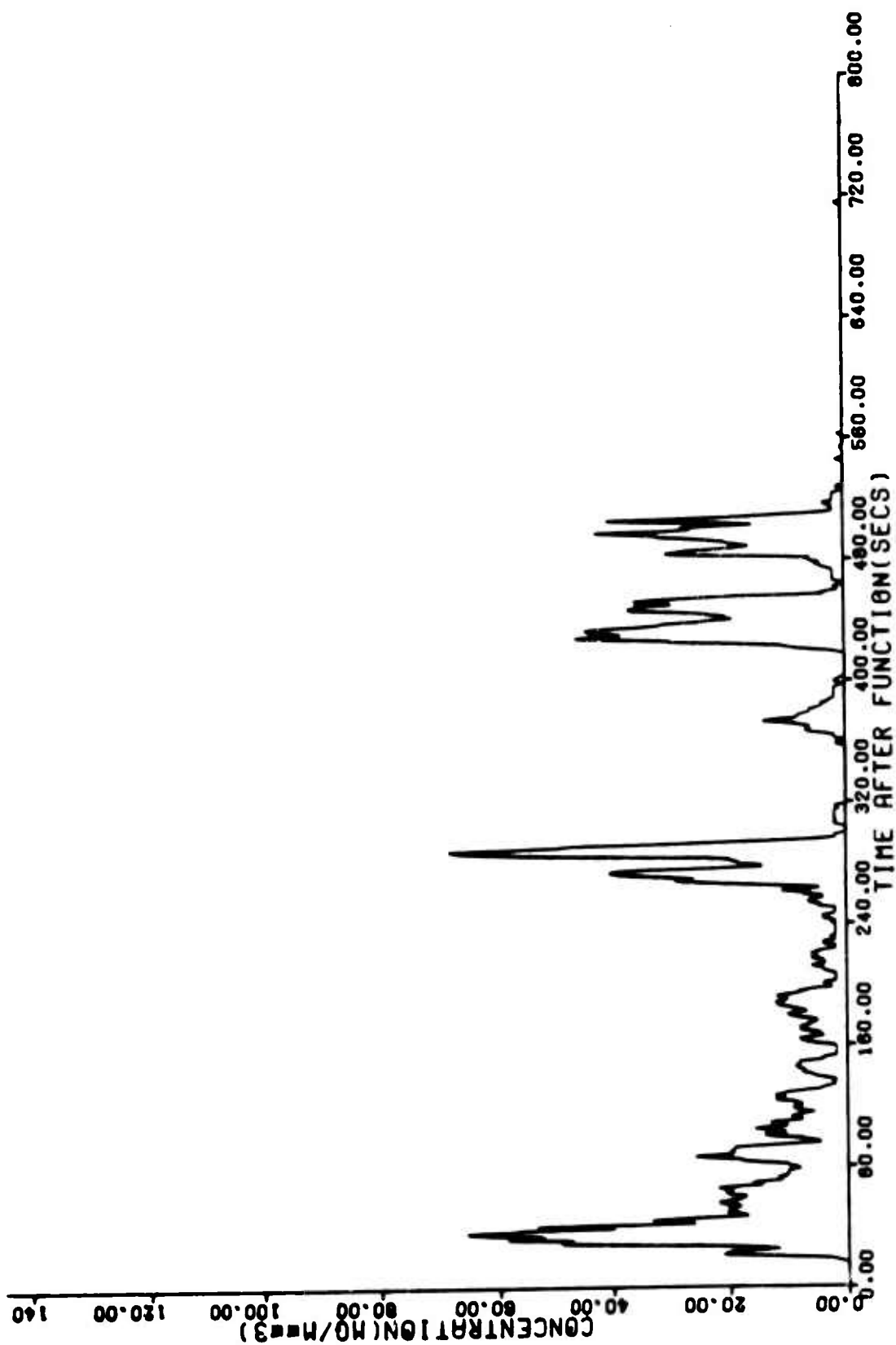
AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00

8-1-10-12



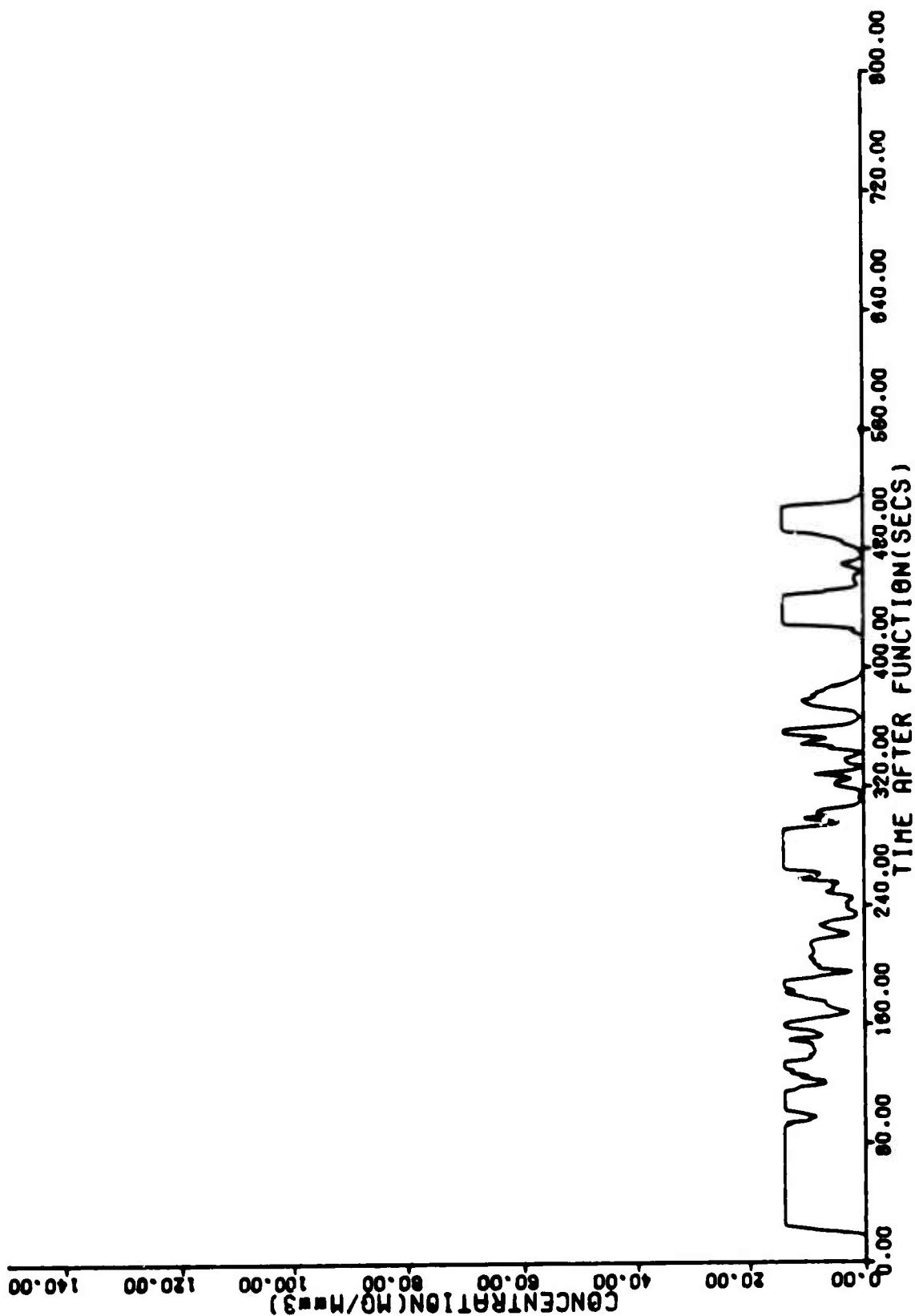
TRIAL 15 (DP-1002). 26 OCT 1977. 12:13:00. WP SMOKE

AEROSOL PHOTOMETER #7. X=0.00. Y=120.00. Z=0.00



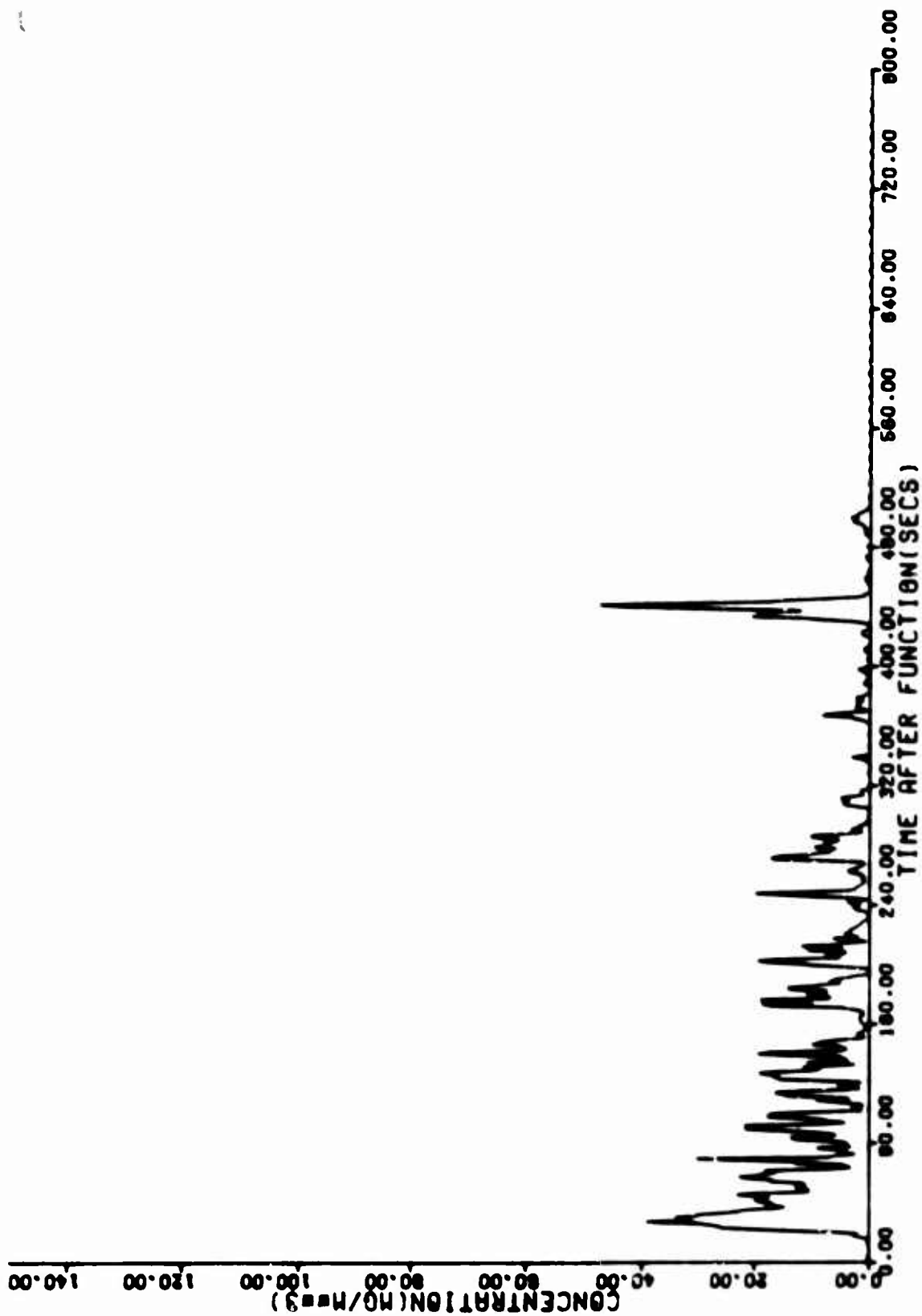
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



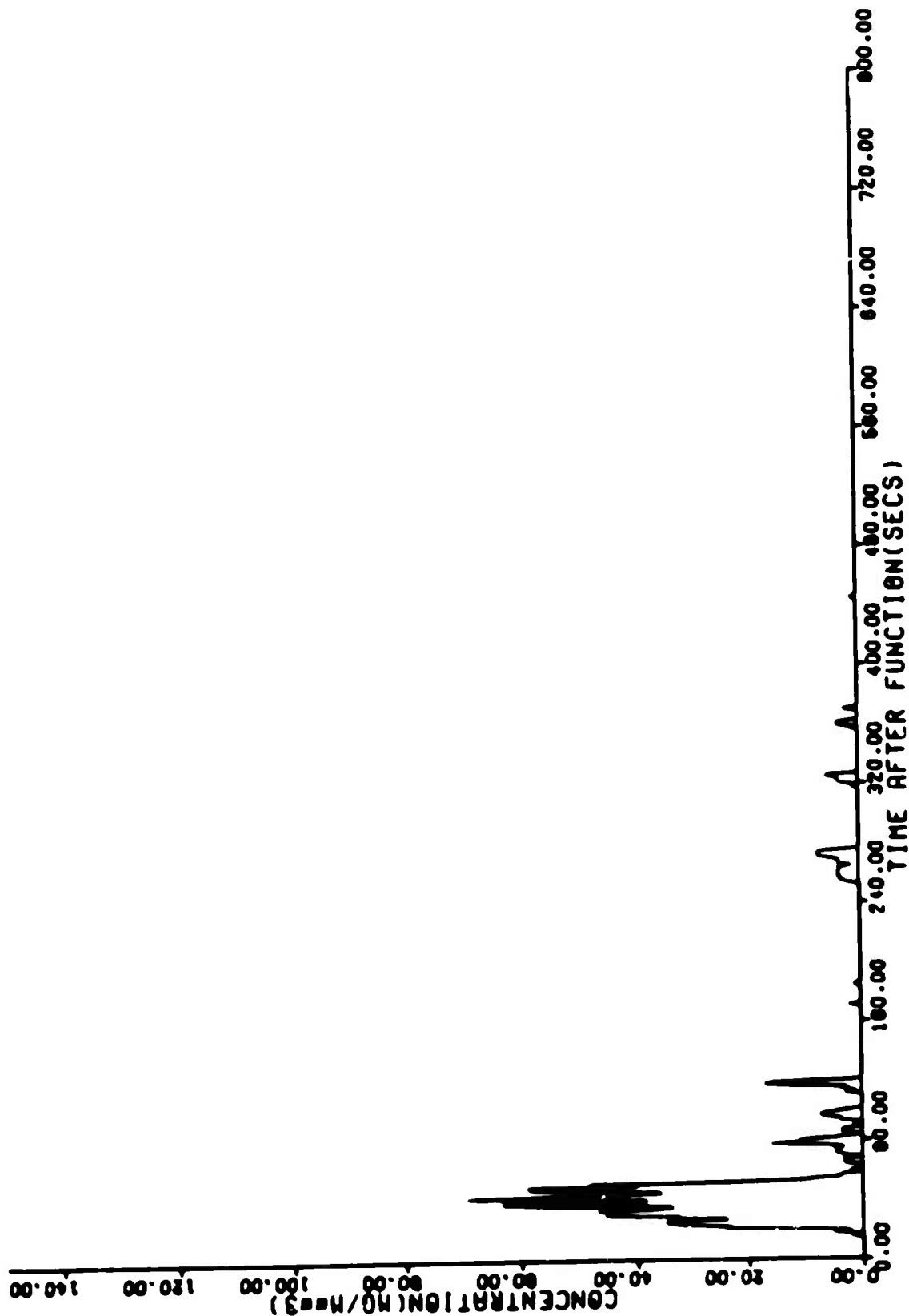
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



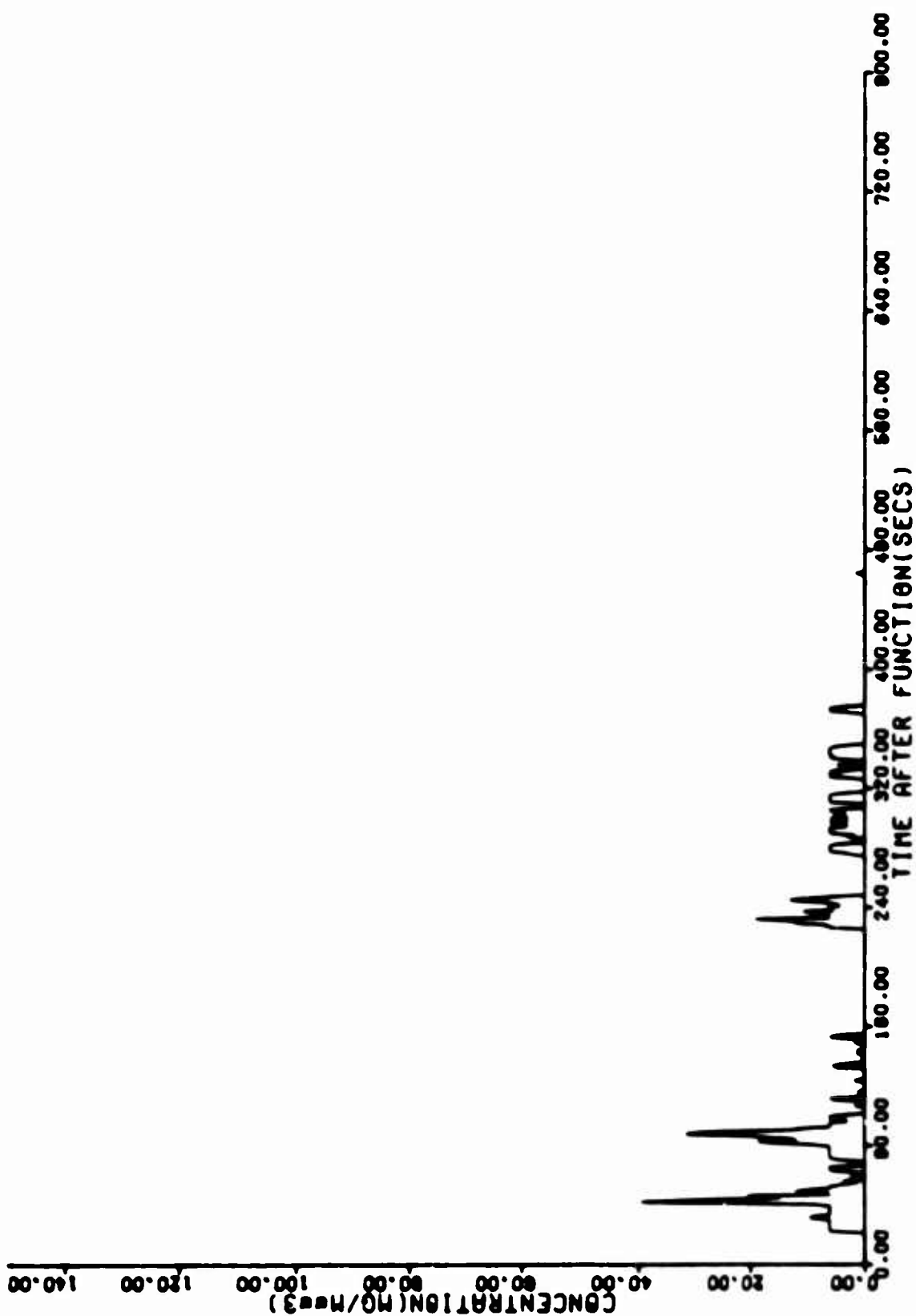
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

AEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00



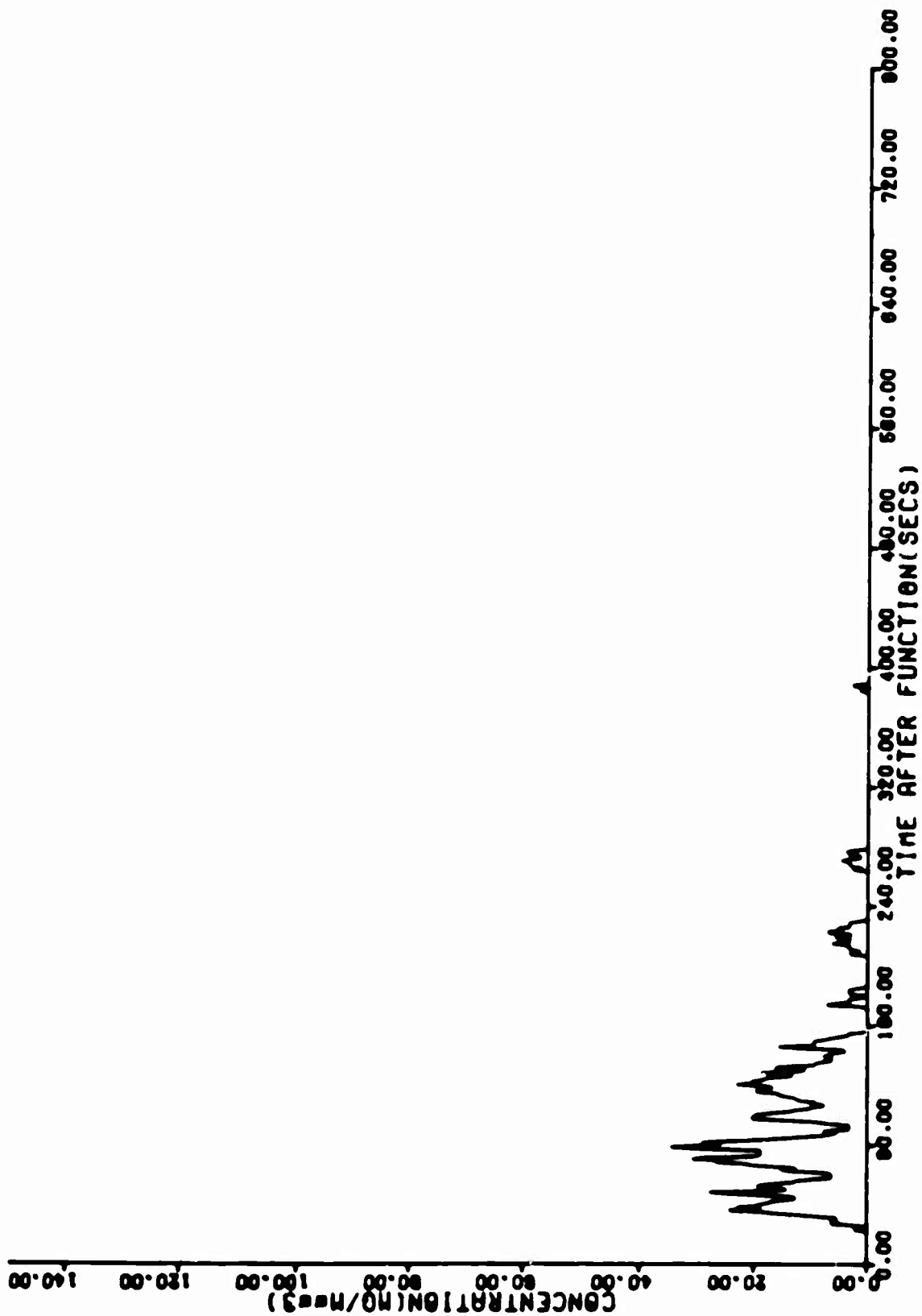
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

PEROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



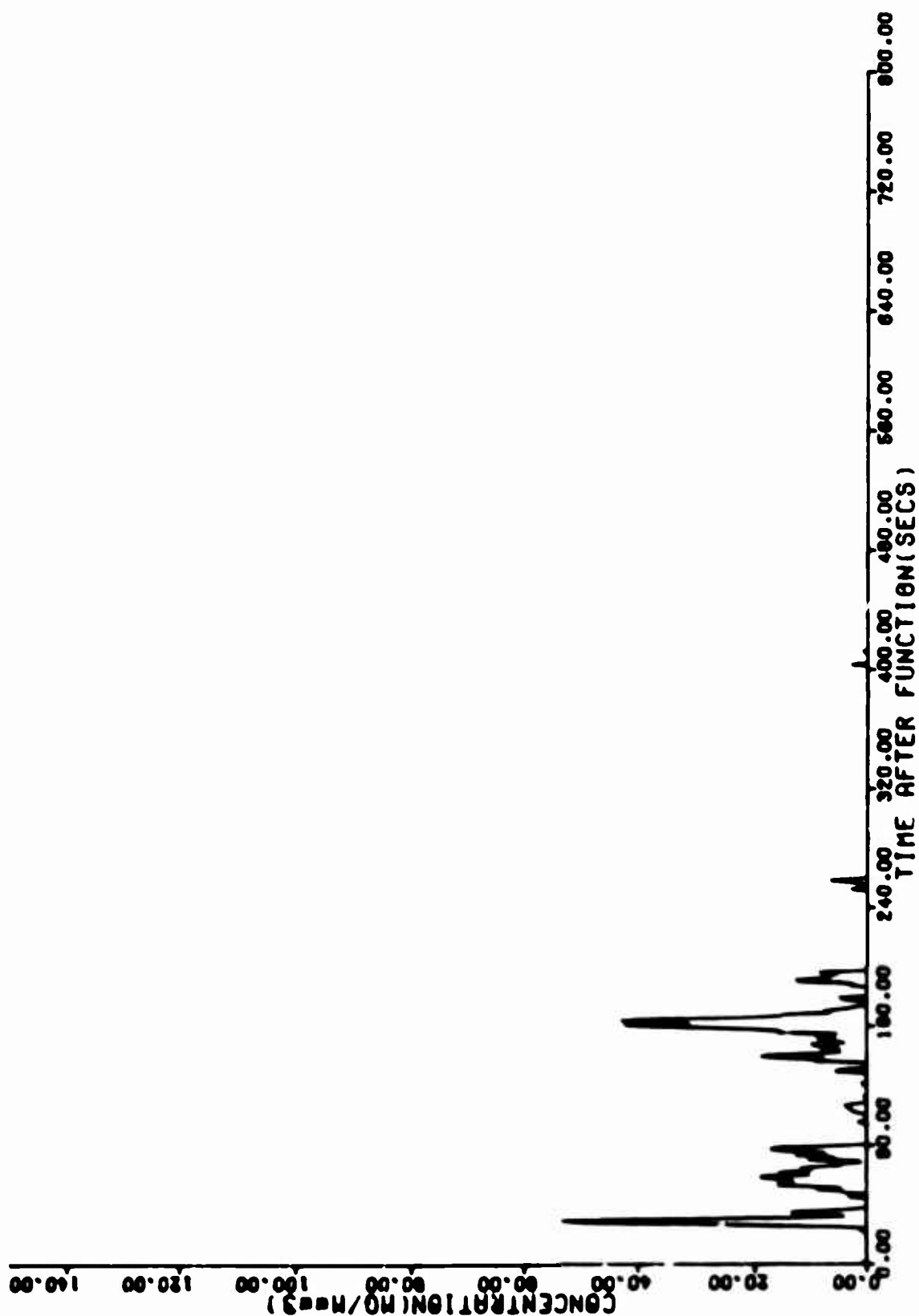
TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



TRIAL 15 (DP-1002). 26 OCT 1977. 12:13:00. WP SMOKE

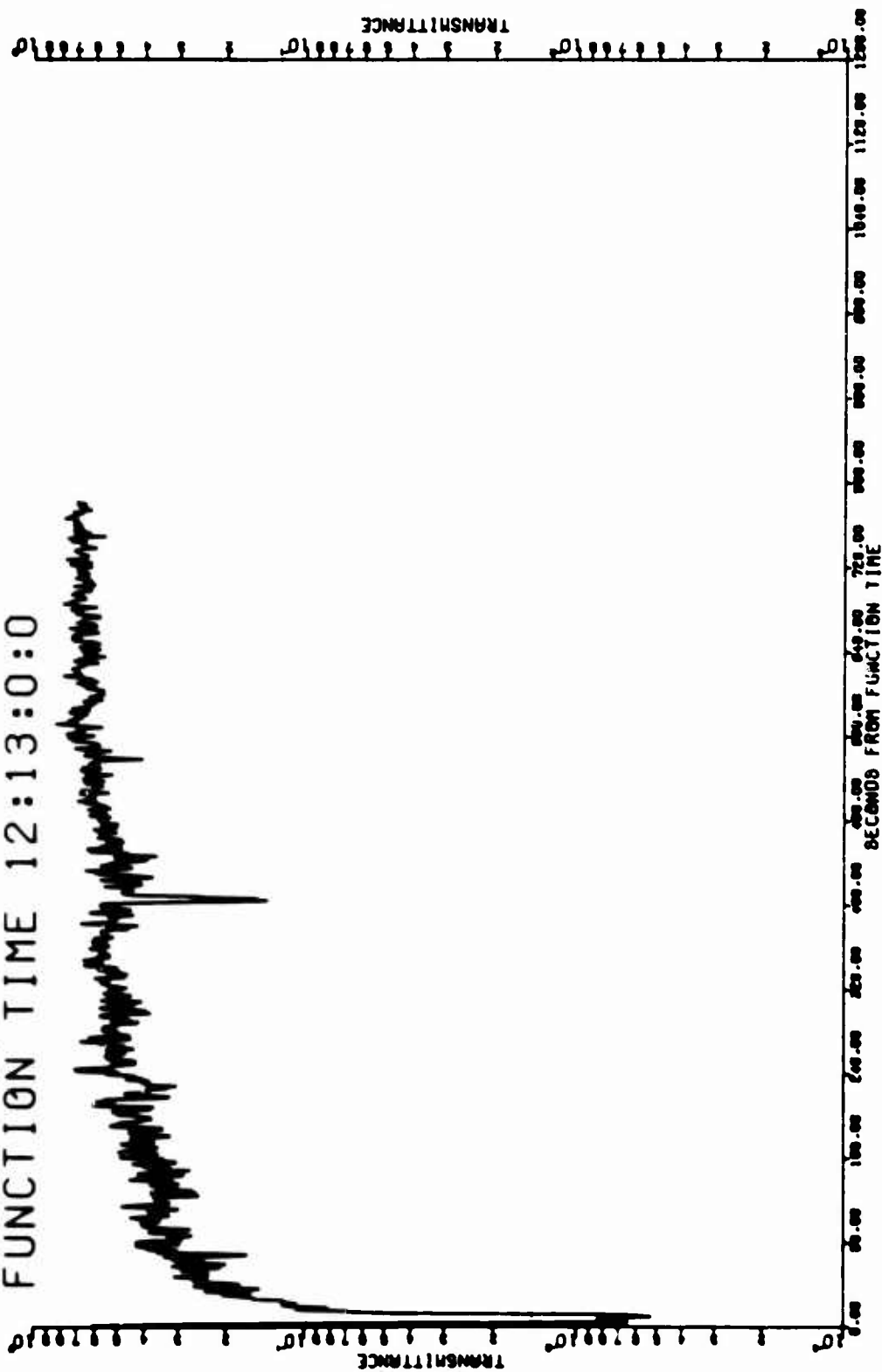
AEROSOL PHOTOMETER #13. X=0.00. Y=174.00. Z=0.00



TRIAL 15 (DP-1002), 26 OCT 1977, 12:13:00, WP SMOKE

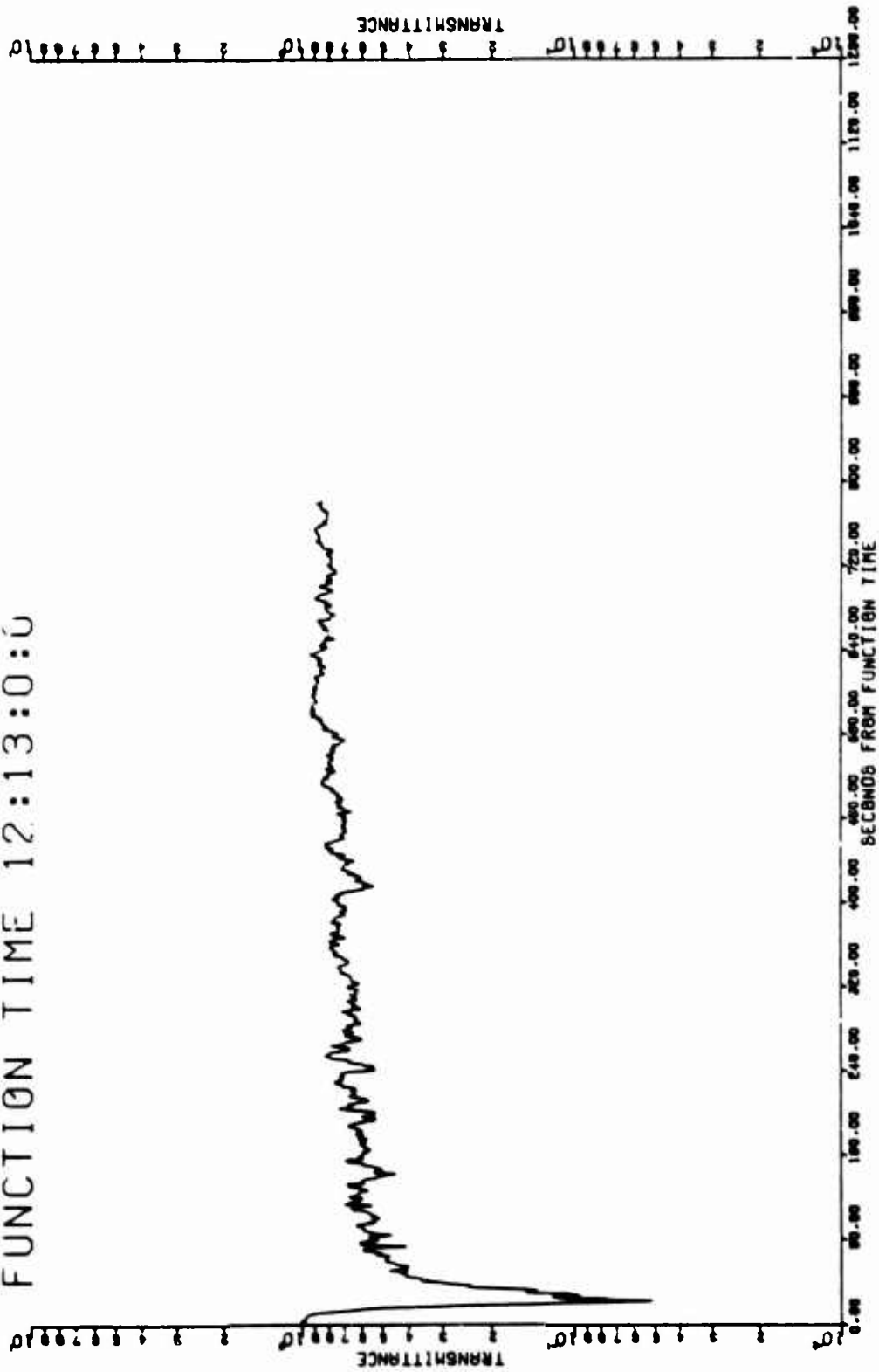
AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00

TRIAL #15 (DP1-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



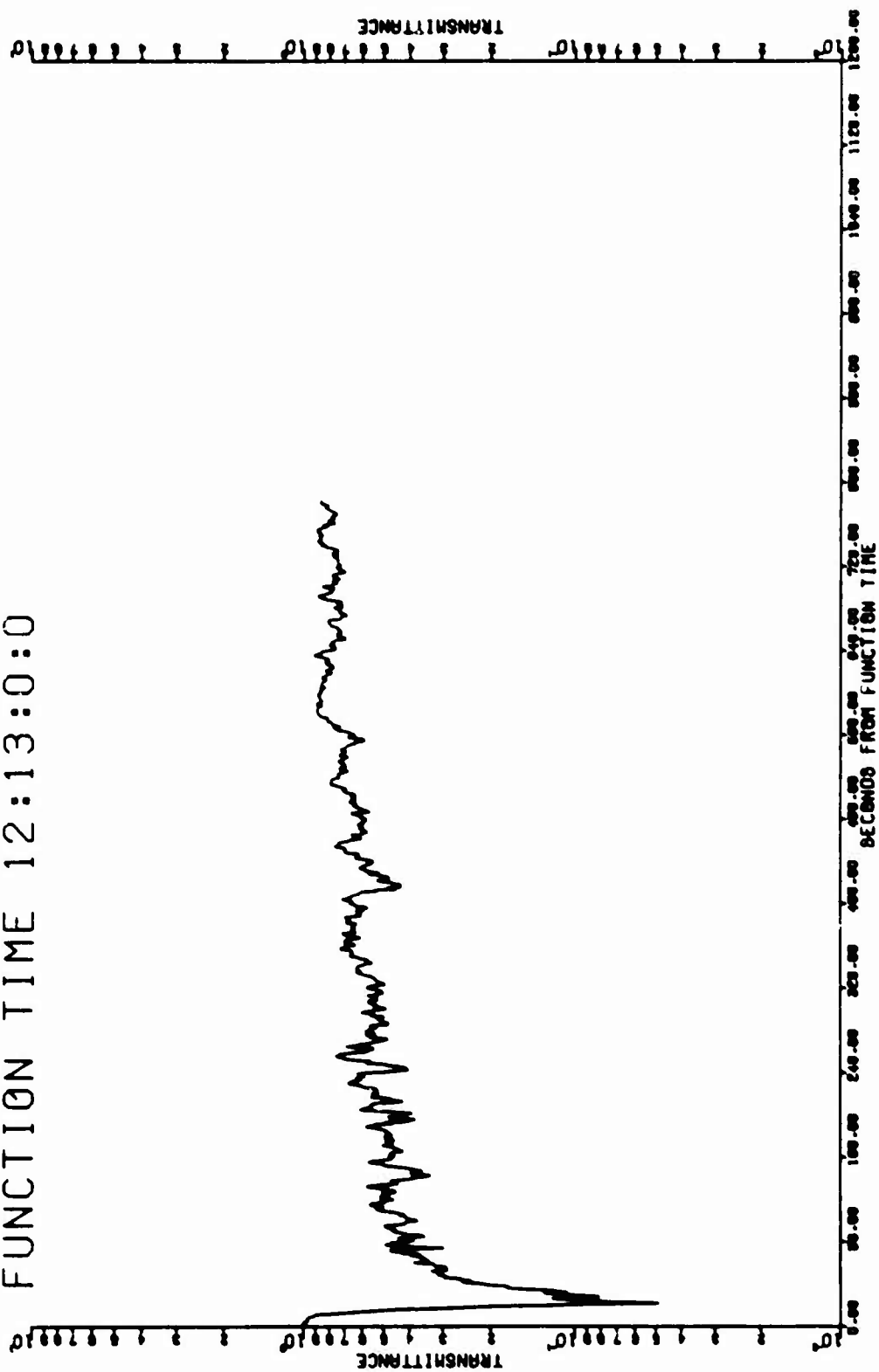
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:00



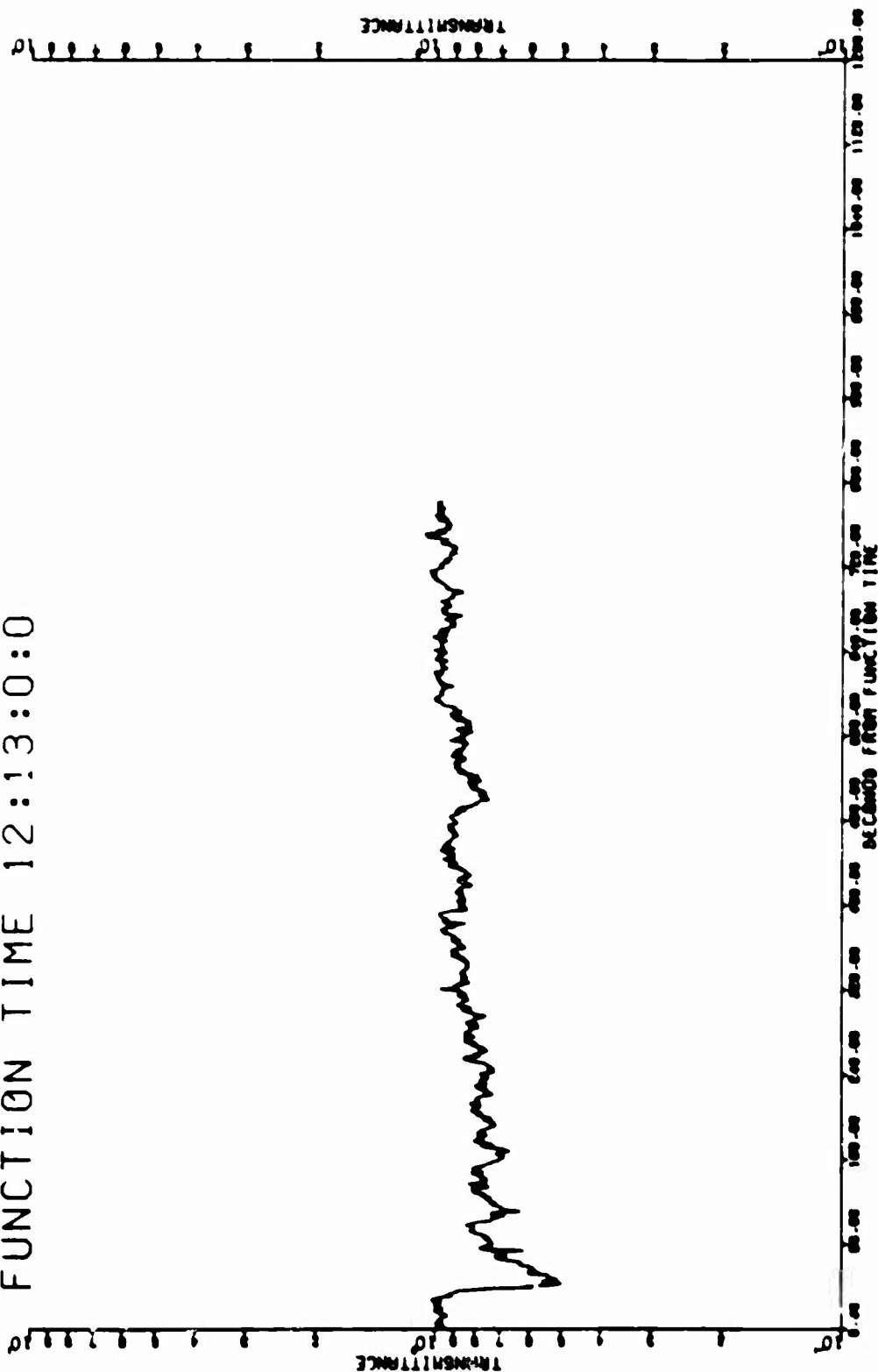
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #15 (DP1-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



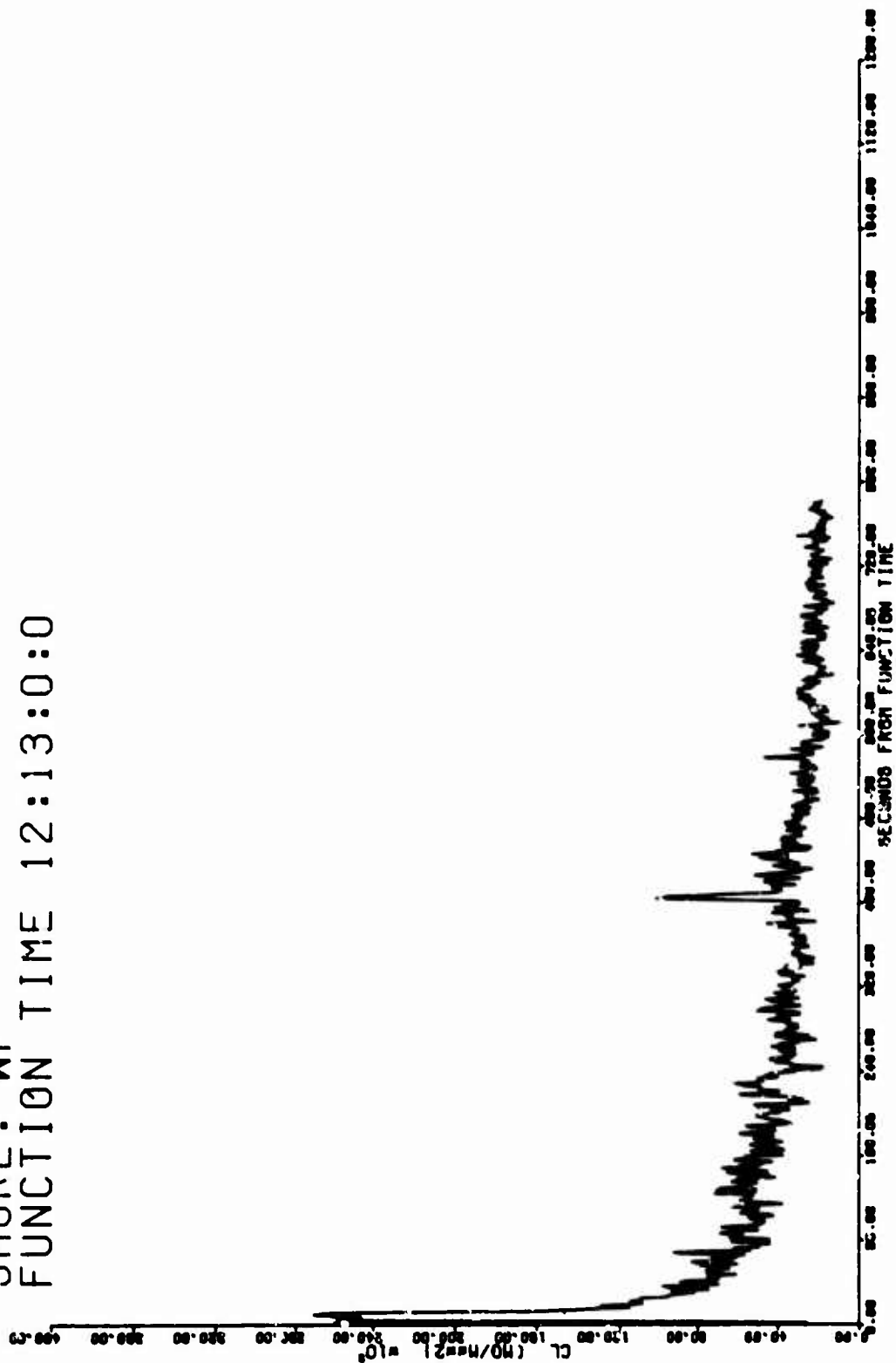
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.750 LOCATED ON ROW 0

TRIAL #15 (DP1-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



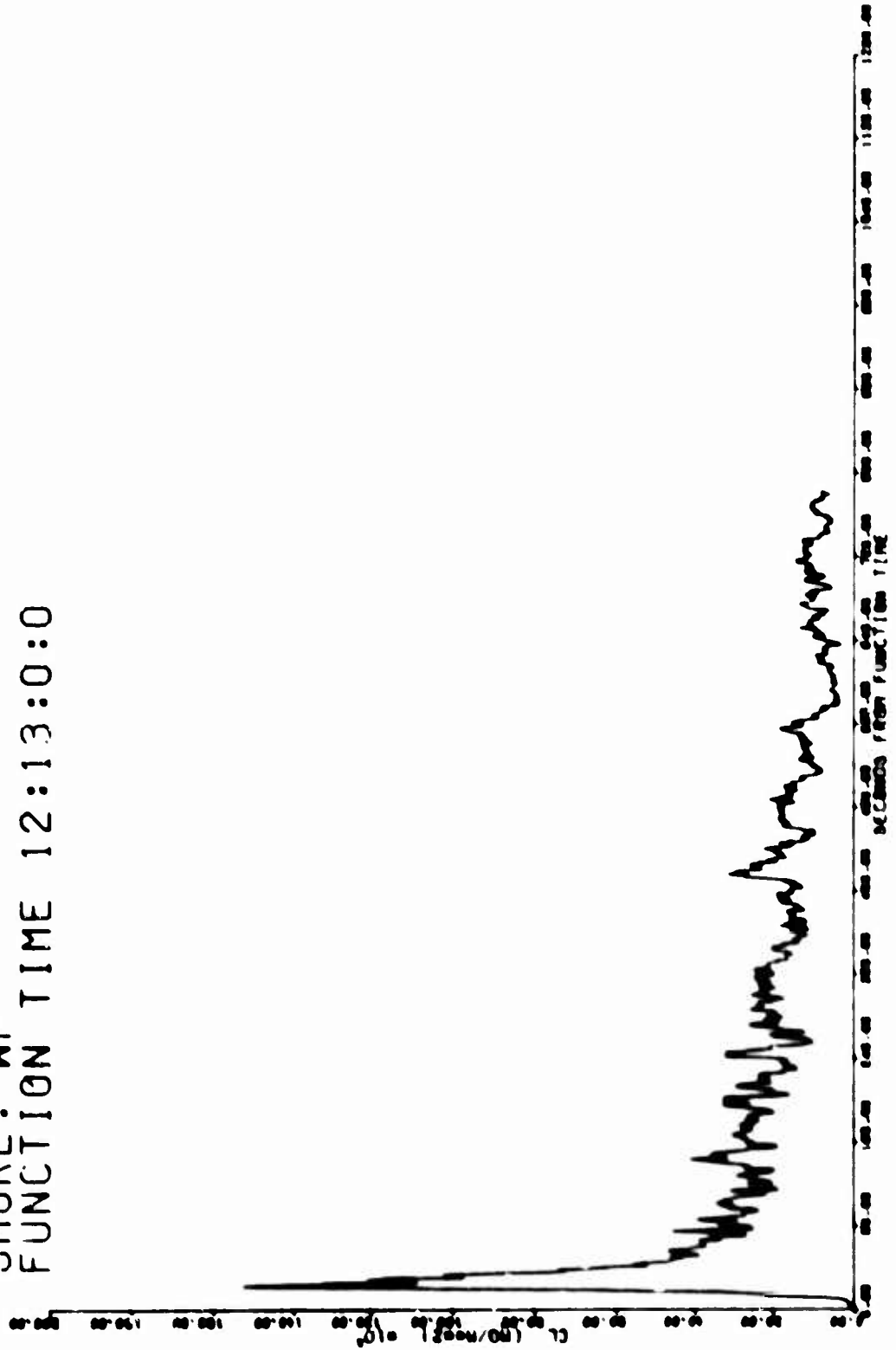
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW 0

TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:0:0



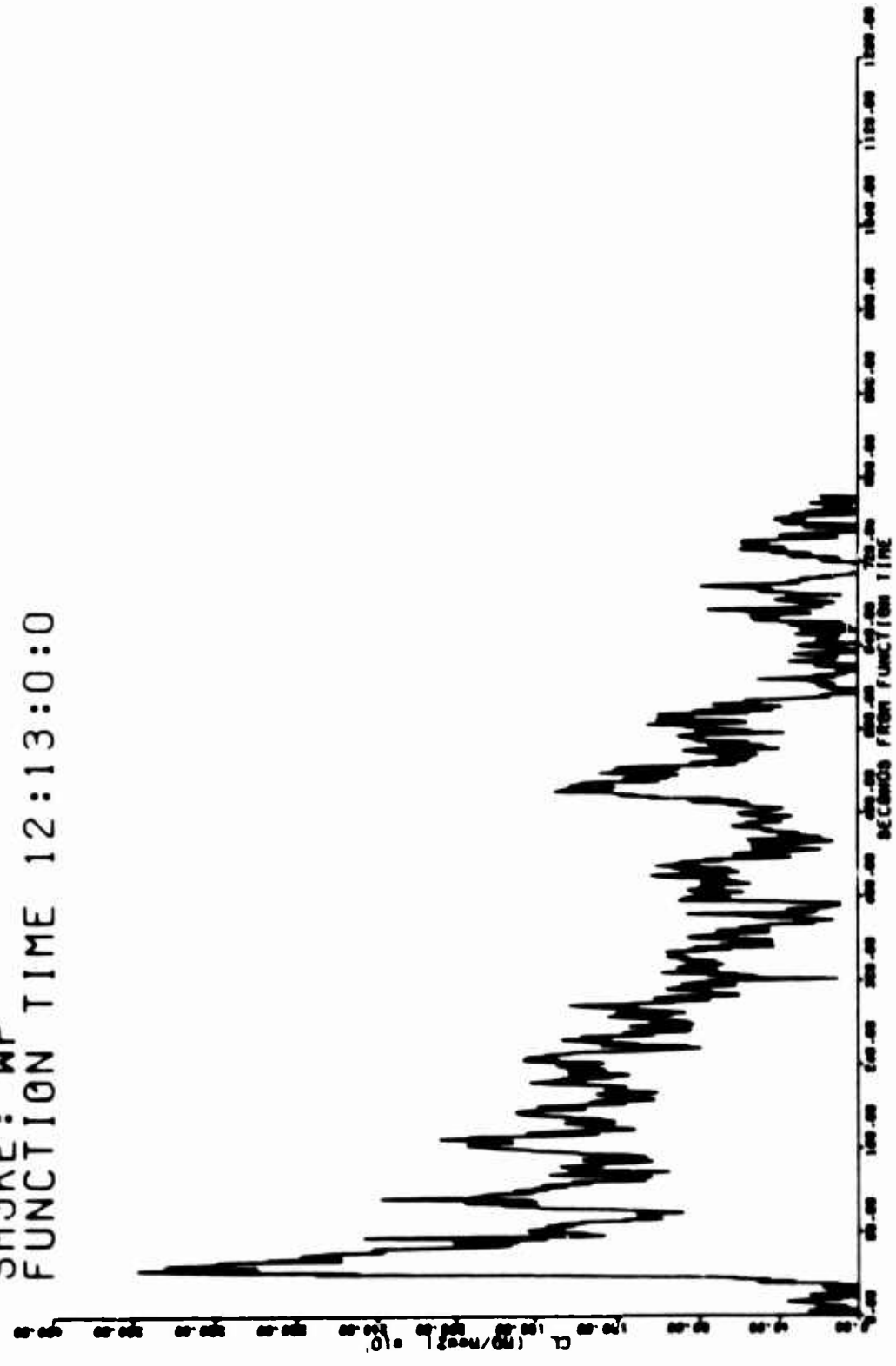
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:0:0



CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

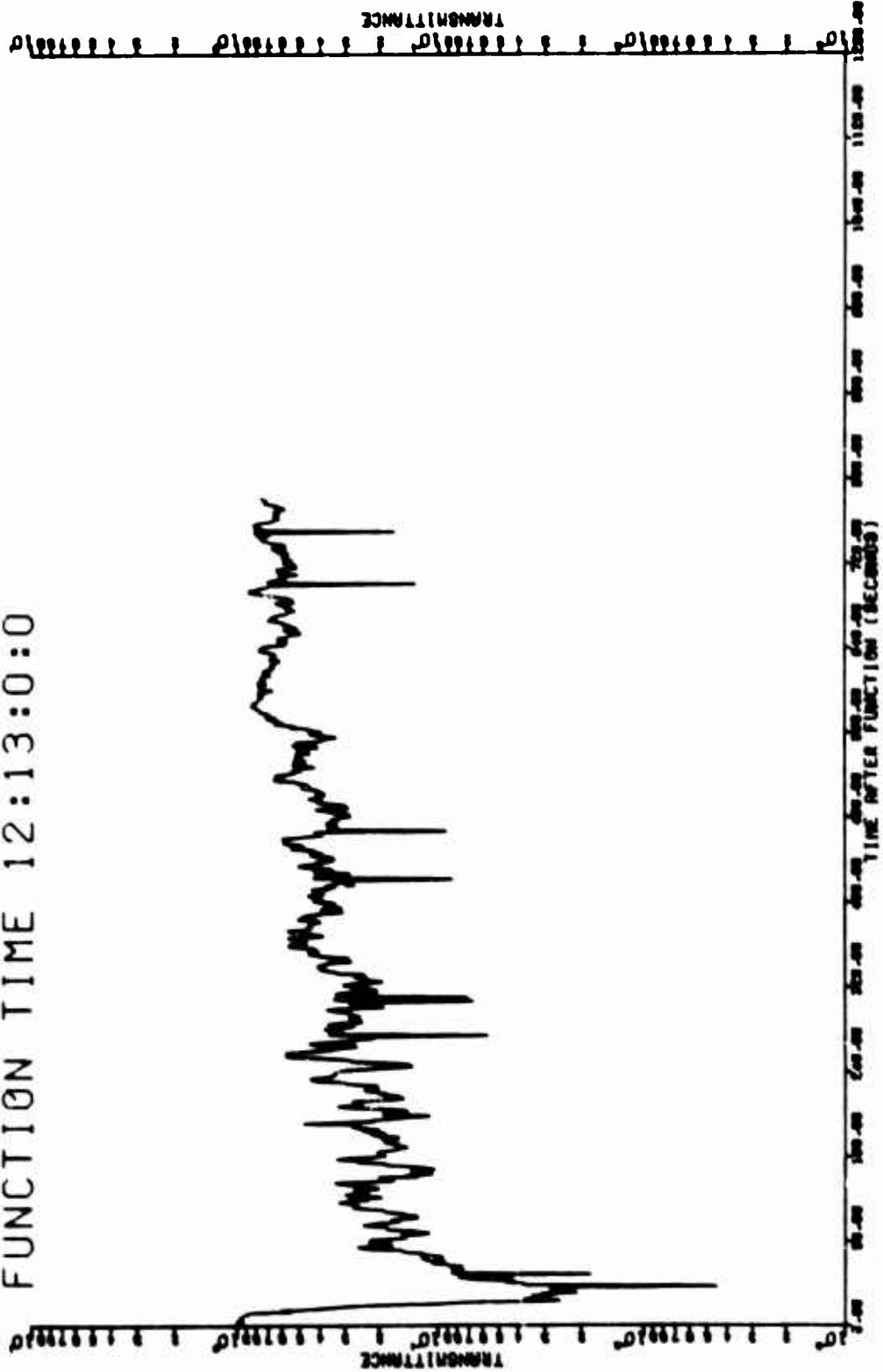
TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SM3KE: WP
 FUNCTION TIME 12:13:0:0



CL VALUES VERSUS TIME FOR RGW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

8-1-10-27

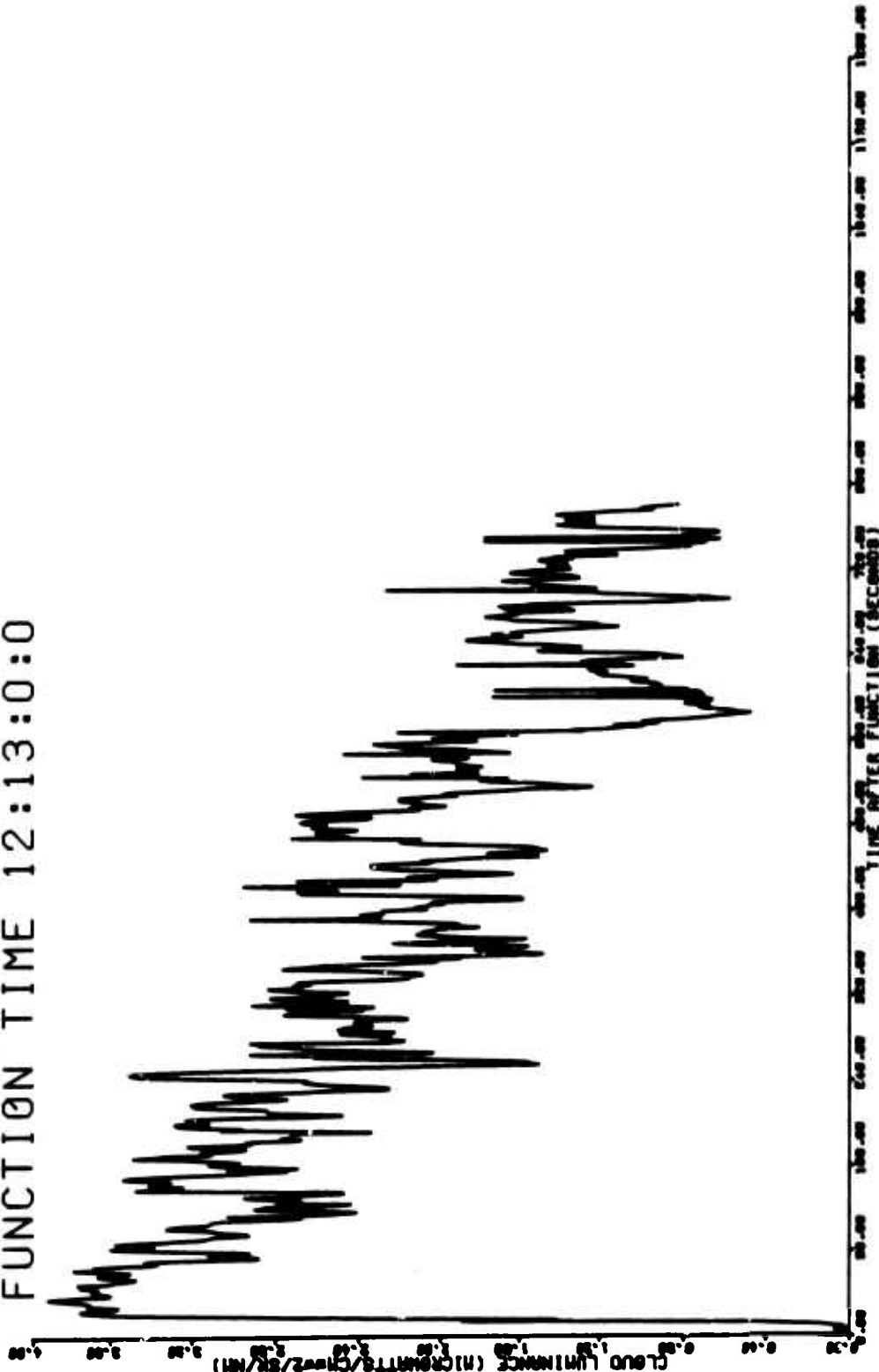
TRIAL #15 (DP1-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

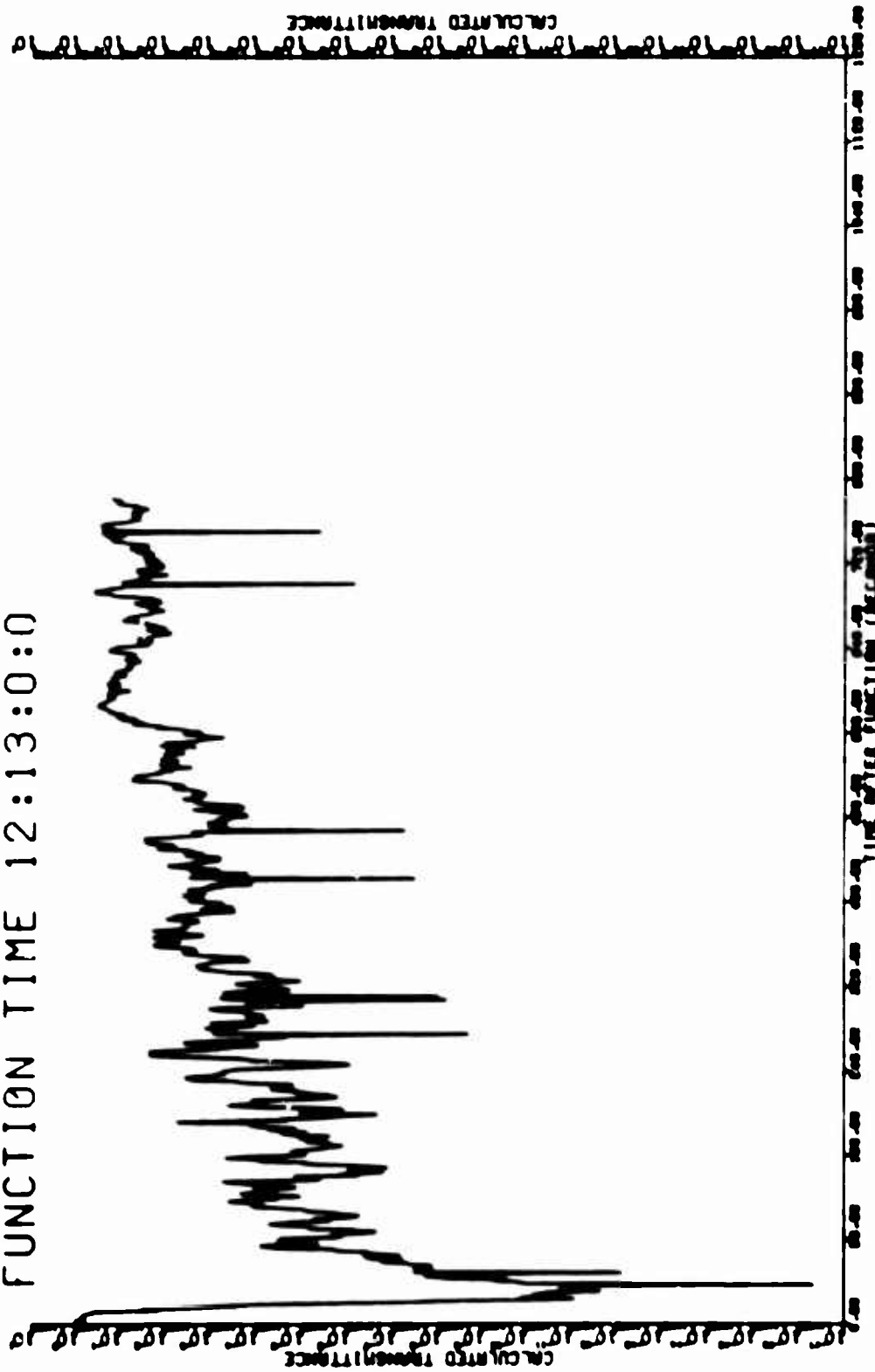
B-I-10-28

TRIAL #15 (DP1-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



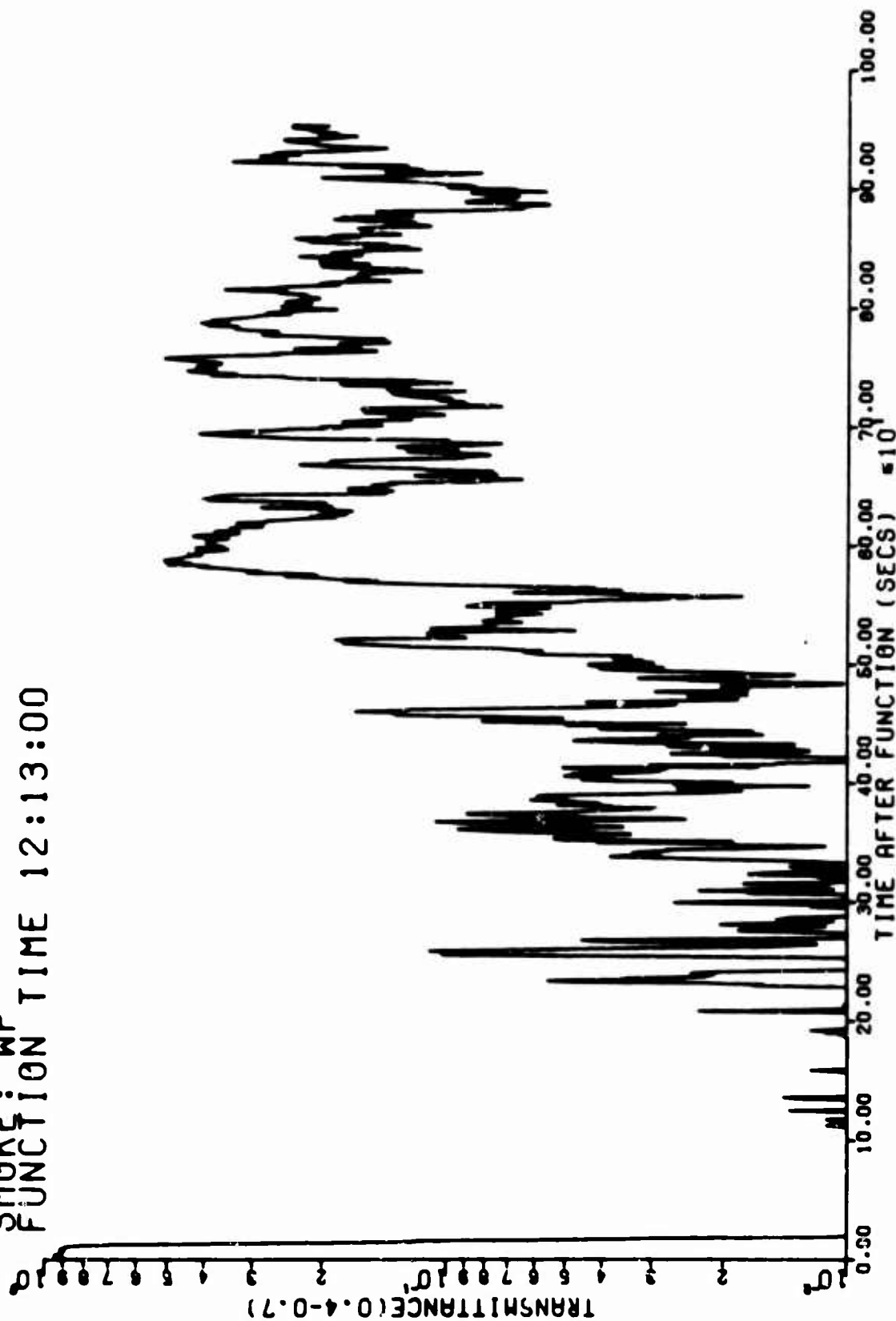
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #15 (DPi-002)
DATE: 26 OCT 1977
SMOKE: WP
FUNCTION TIME 12:13:0:0



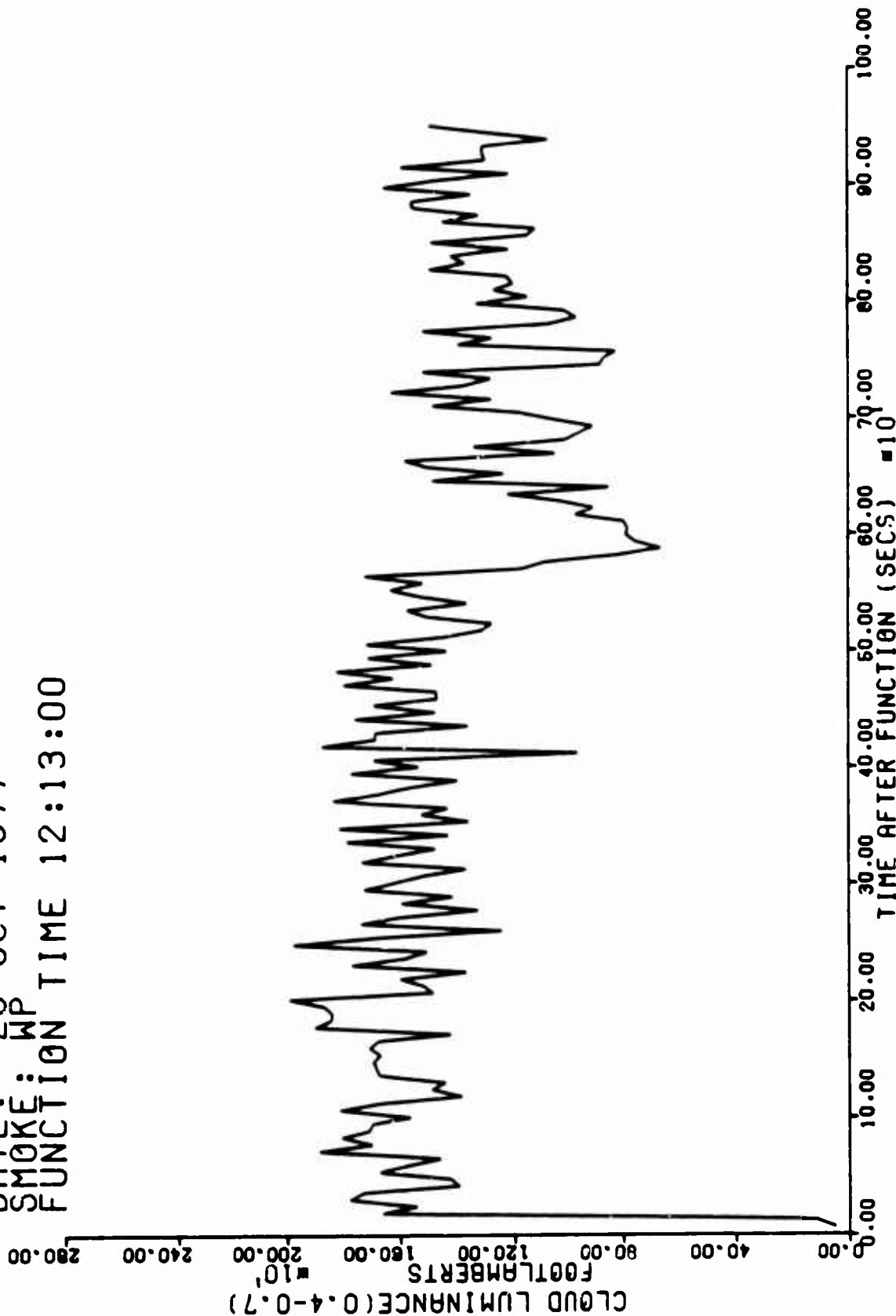
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 15 (DP-1002)
DATE: 26 Oct 1977
SMOKE: WP
FUNCTION TIME 12:13:00



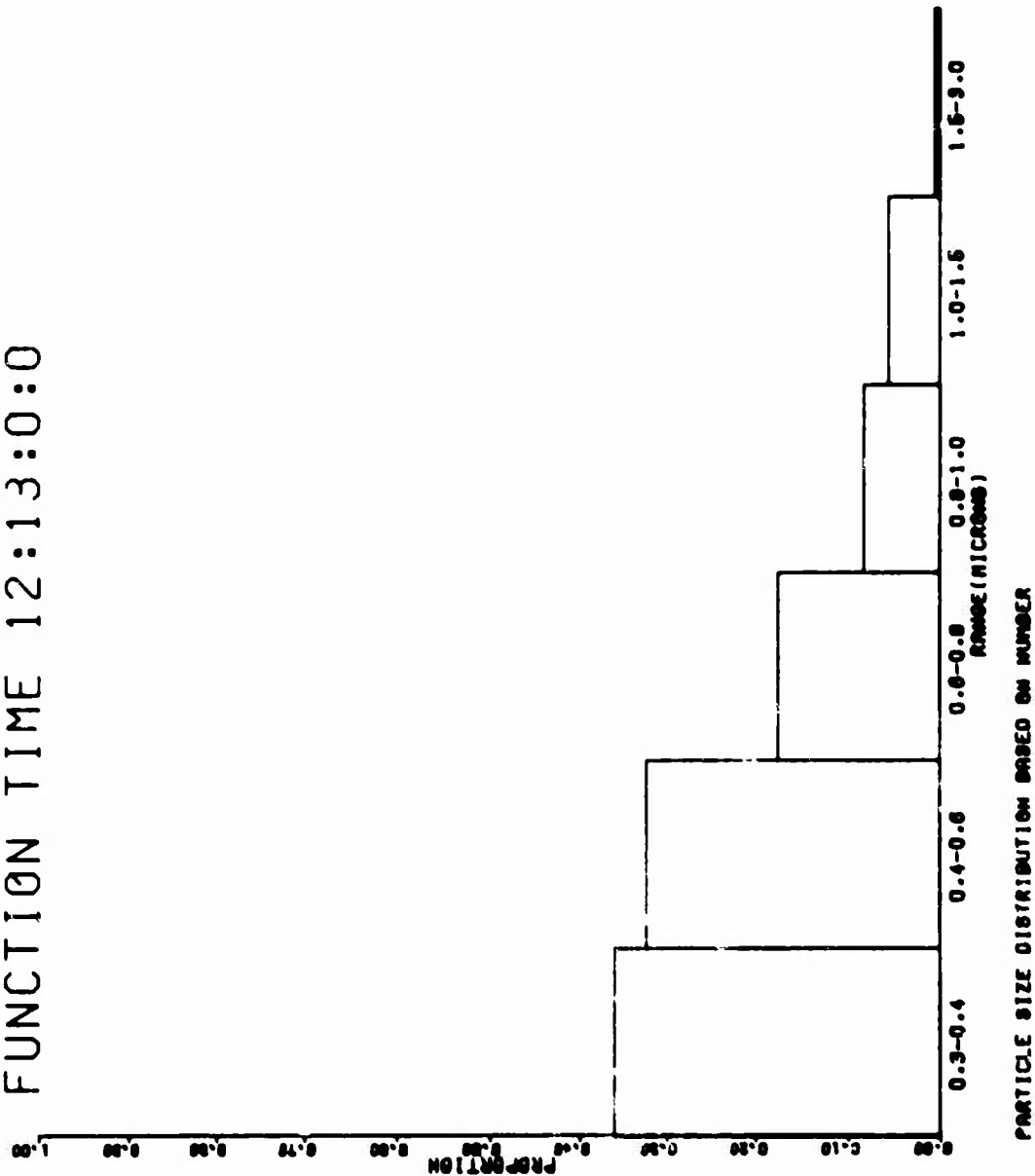
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW Q

TRIAL 15 (DP-1002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:00



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #15 'DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:0:0

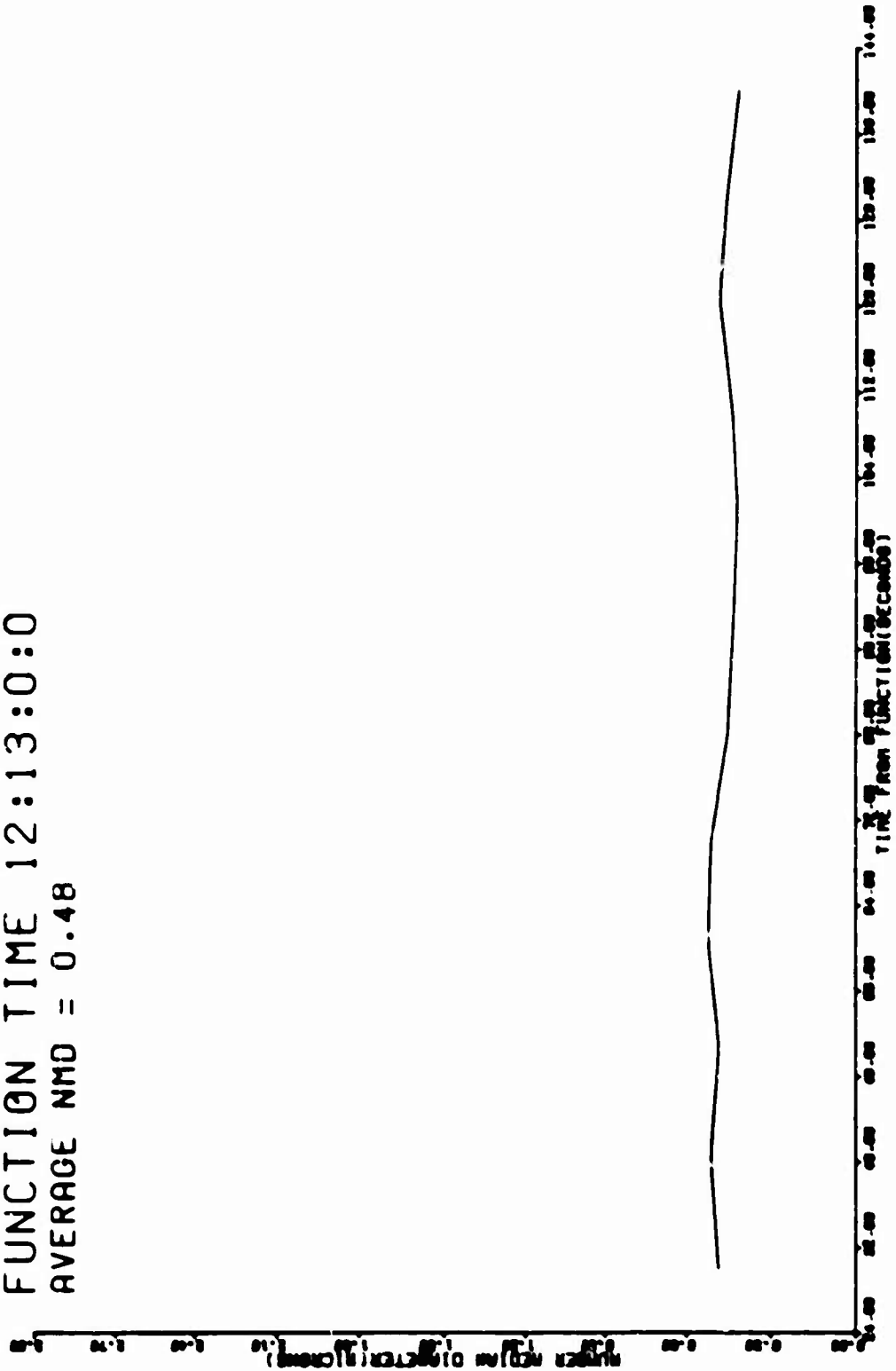


TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #15 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: WP
 FUNCTION TIME 12:13:0:0
 AVERAGE NMD = 0.48



APPENDIX B-I-11

TRIAL DP1-002-T-17 (WP SMOKE) 23 SEP 1977

SUMMARY OF TEST DATA	B-I-11-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-11-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-11-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-11-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-11-12
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-11-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-11-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-11-15
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-11-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-11-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-11-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-11-19
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-11-20
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-11-21
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-11-22

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-11-23
FIGURE:	PARTICLE SIZE DISTRIBUTION	ND
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	ND
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	ND

SUMMARY OF TEST DAY DATA

Trial: 17

Date: 23 Sep 77

Time: 1218 MDT

Wind Direction (Transport) (degrees) (4m)	151
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.7
Temperature at 2-meters, Trial Time (T, °C)	13.0
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	ND
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	ND
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.4
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.16
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	37
Solar Azimuth (deg)	155.2
Solar Altitude (deg)	46.8
Air Density - ρ (kg m ⁻³)	1.06169
Solar Radiation (Langley's per minute)	1.144
Barometric Pressure (millibars)	370.5
Visibility (km)	137
Reflectivity, OD Target	0.09
Haze (footlamberts)	22
Brightness, Background (footlamberts)	1027
Brightness, White Target (footlamberts)	1776
Brightness, OD Target	185
Percent Opaque Cloud Cover	3

Munitions/Submunitions Used (WP, 81mm) 1

Number of Munitions/Submunitions Functioned 1

Particle Size Range (micron) *

(0.3 - 0.4) ND

(0.4 - 0.6) ND

(0.6 - 0.8) ND

(0.8 - 1.0) ND

(1.0 - 1.5) ND

(1.5 - 3.0) ND

Log₁₀NMD ND

σLog₁₀NMD NC

NMD ND

MMD ND

*No data available

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1218:00	7	4	3
1218:10	23	14	16
1218:20	40	23	16
1218:30	71	50	18
1218:40	90	50	19
1218:50	84	68	15
1219:00	54	81	12

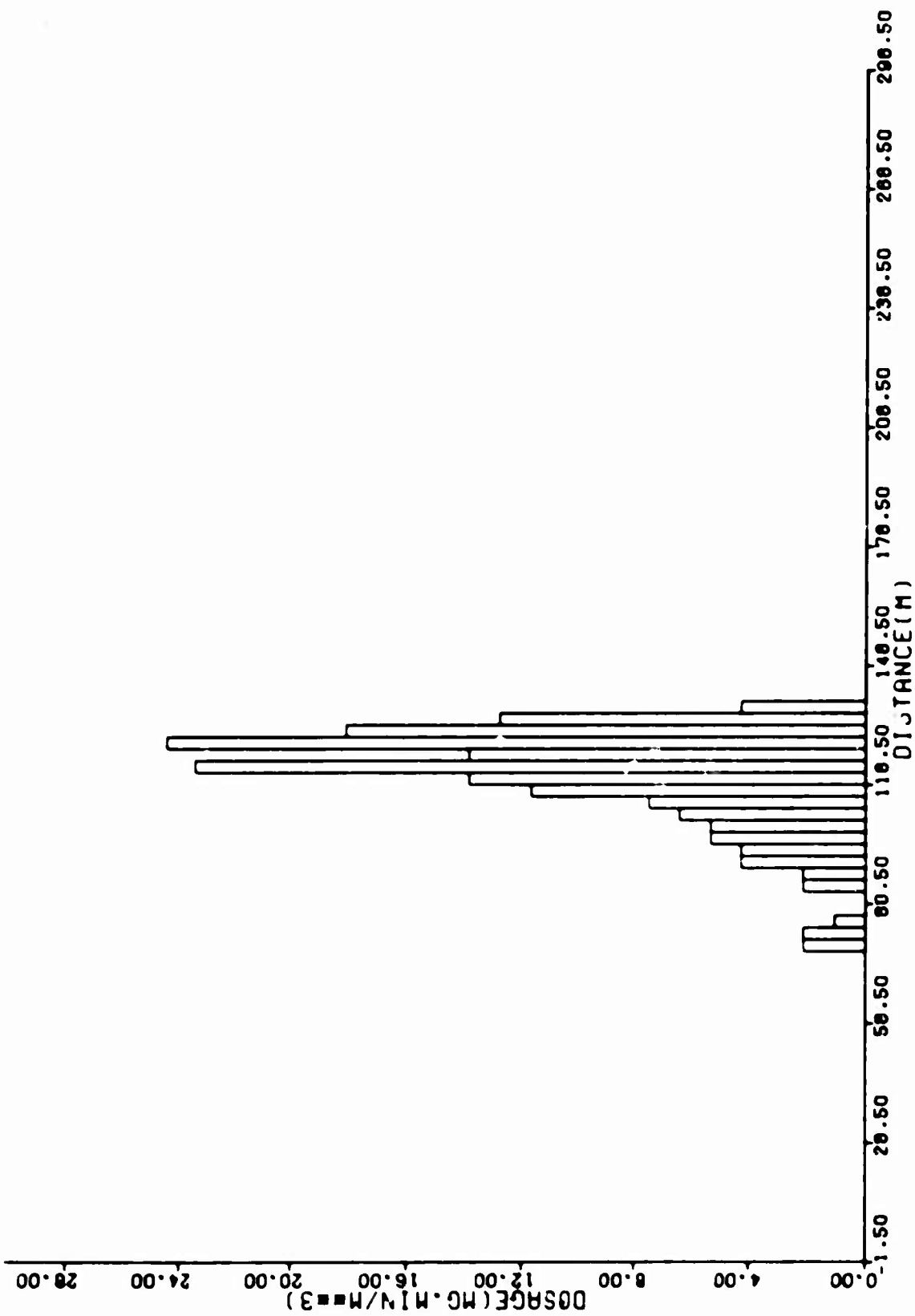
1219:10 Cloud dissipated

SKY BRIGHTNESS

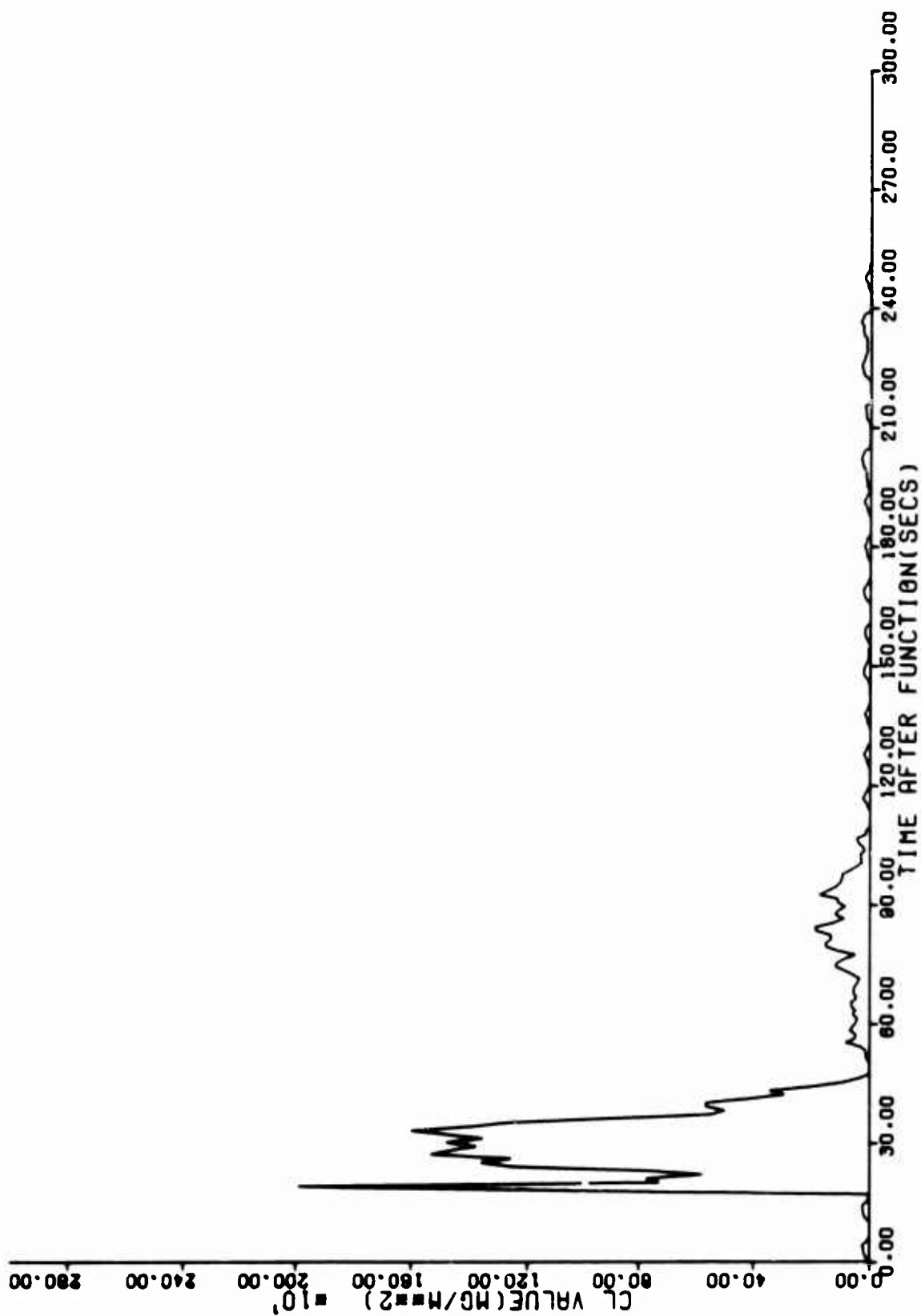
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	1300
5	2212
10	2212
15	2212
20	2212
25	2668
30	2668
35	2328
40	2328
45	2328

Viewing azimuth. 240° except 255° at 0 degrees elevation

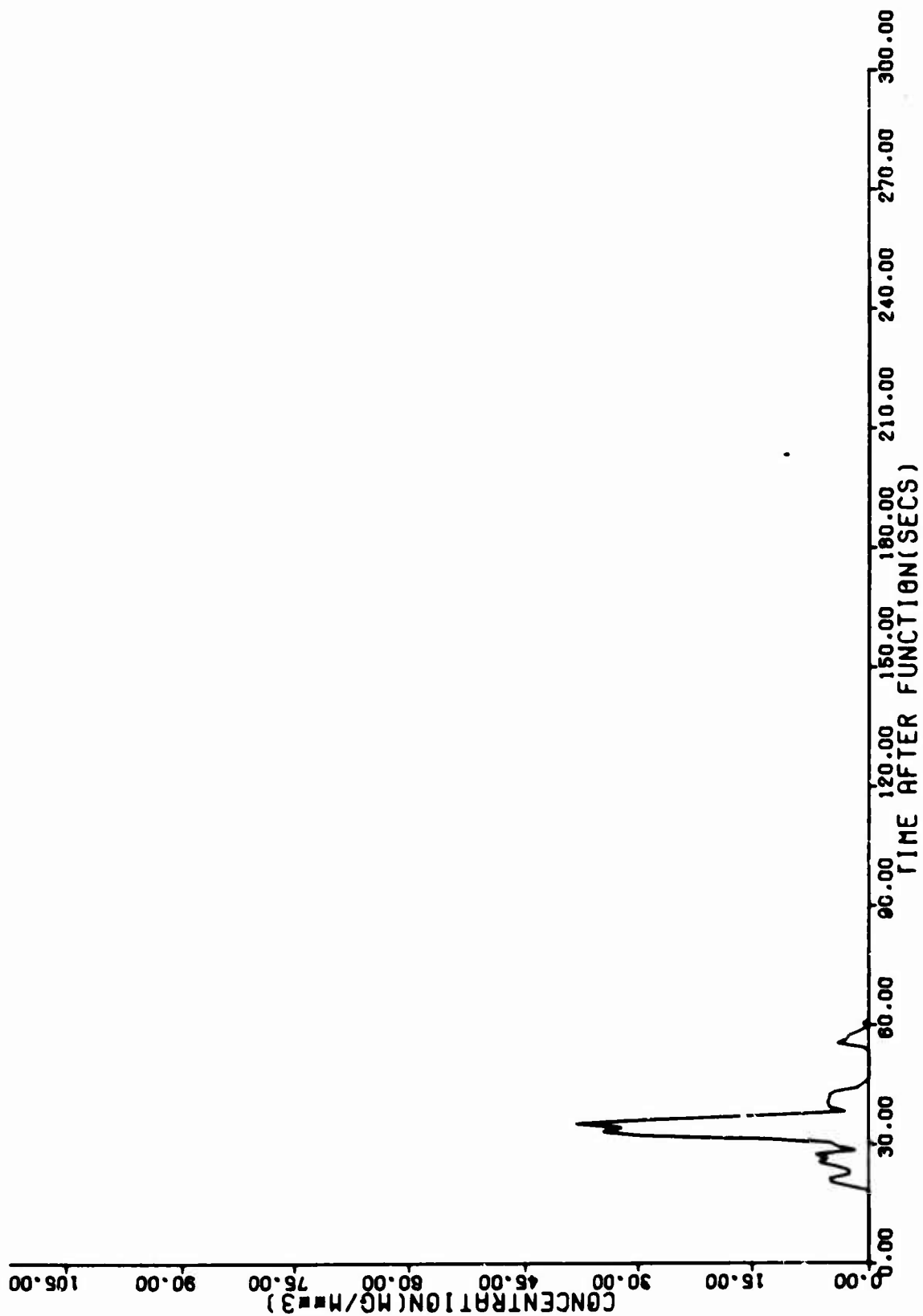


TRIAL 17 (DP-1002). 23 SEP 1977, 12:18:00, WP SMOKE



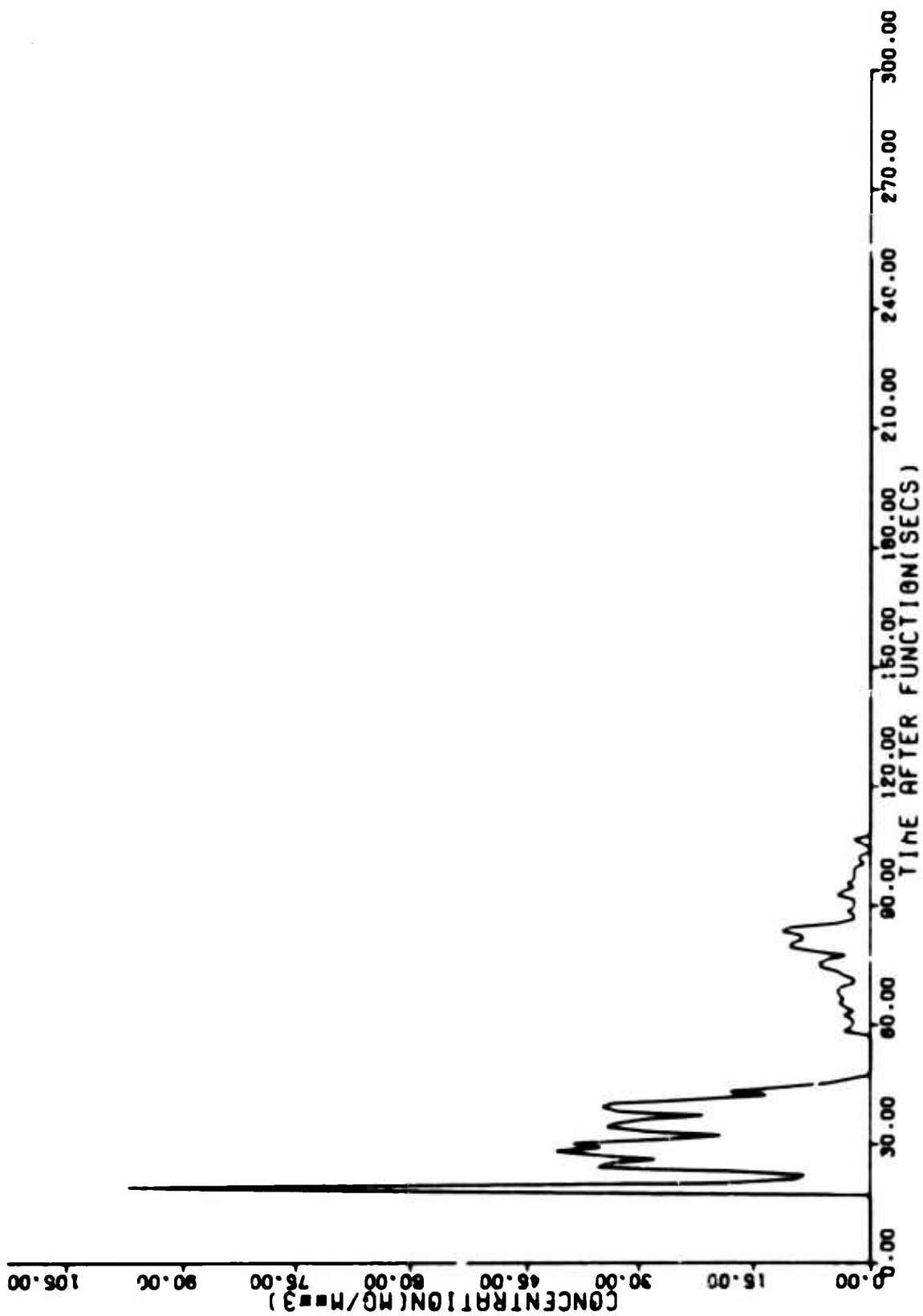
TRIAL 17 (DP-1002). 23 SEP 1977, 12:18:00, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



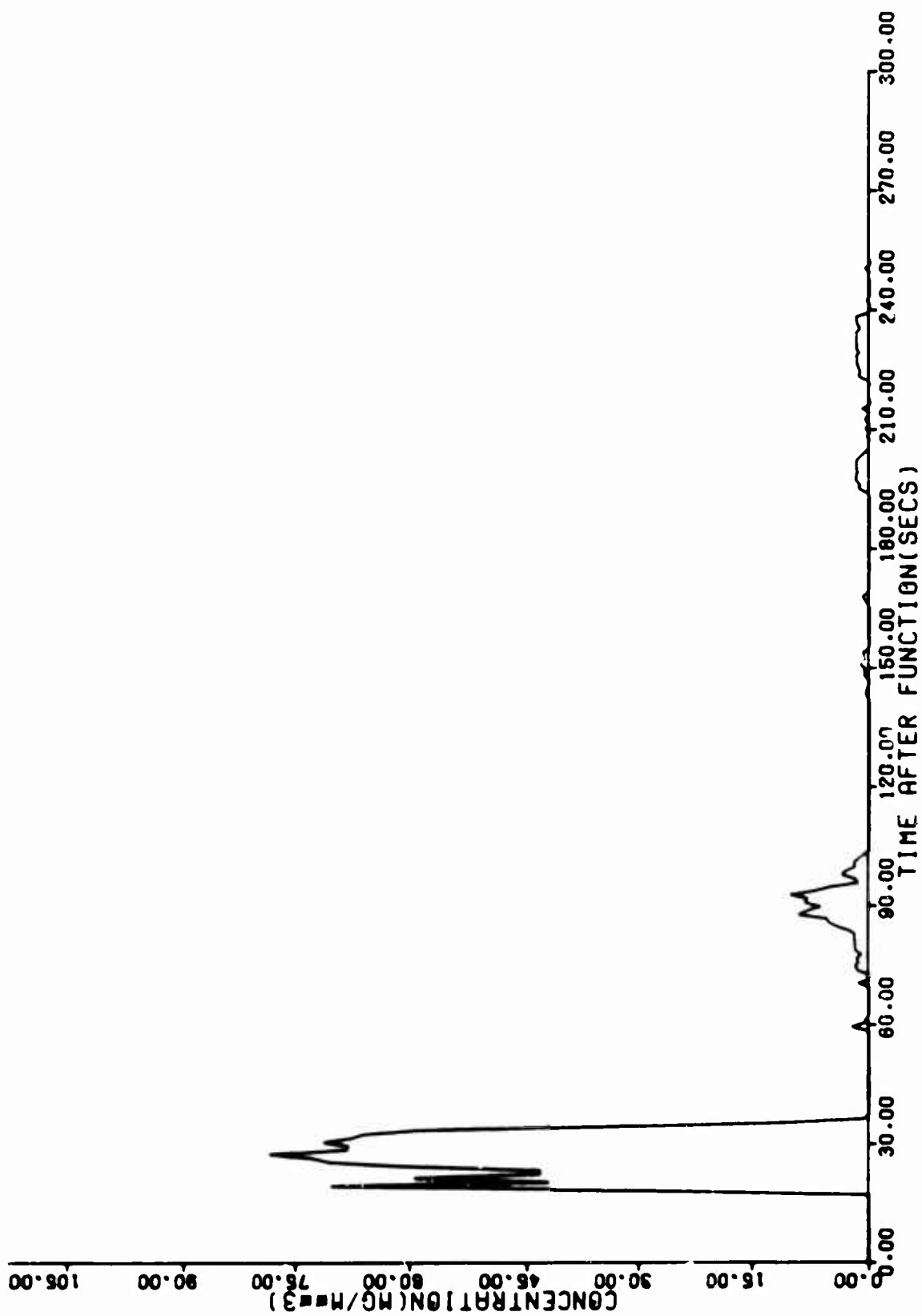
TRIAL 17 (DP-1002), 23 SEP 1977, 12:18:00, WP SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



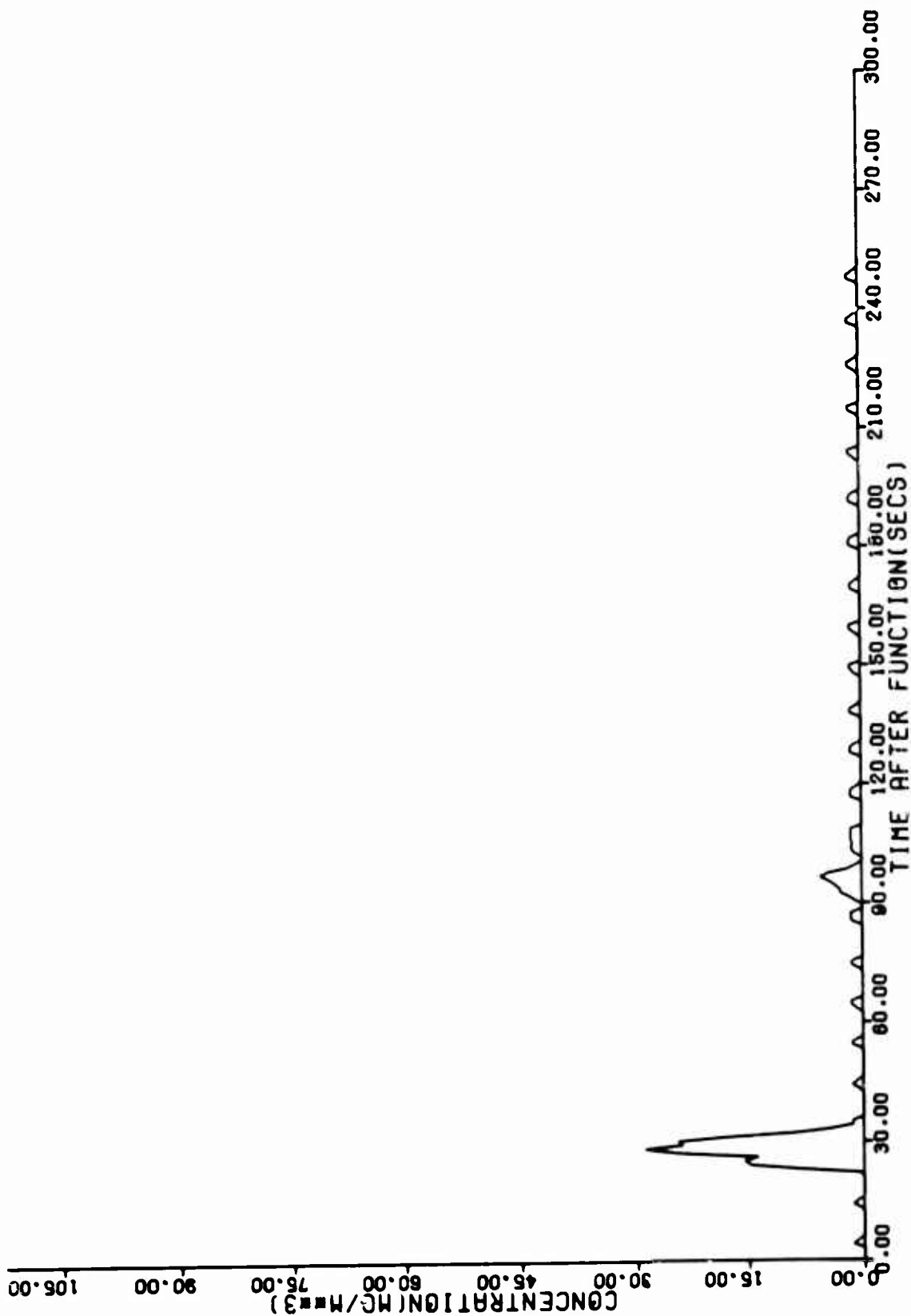
TRIAL 17 (DP-1002), 23 SEP 1977, 12:18:00, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



TRIAL 17 (DP-1002), 23 SEP 1977, 12:18:00, WP SMOKE

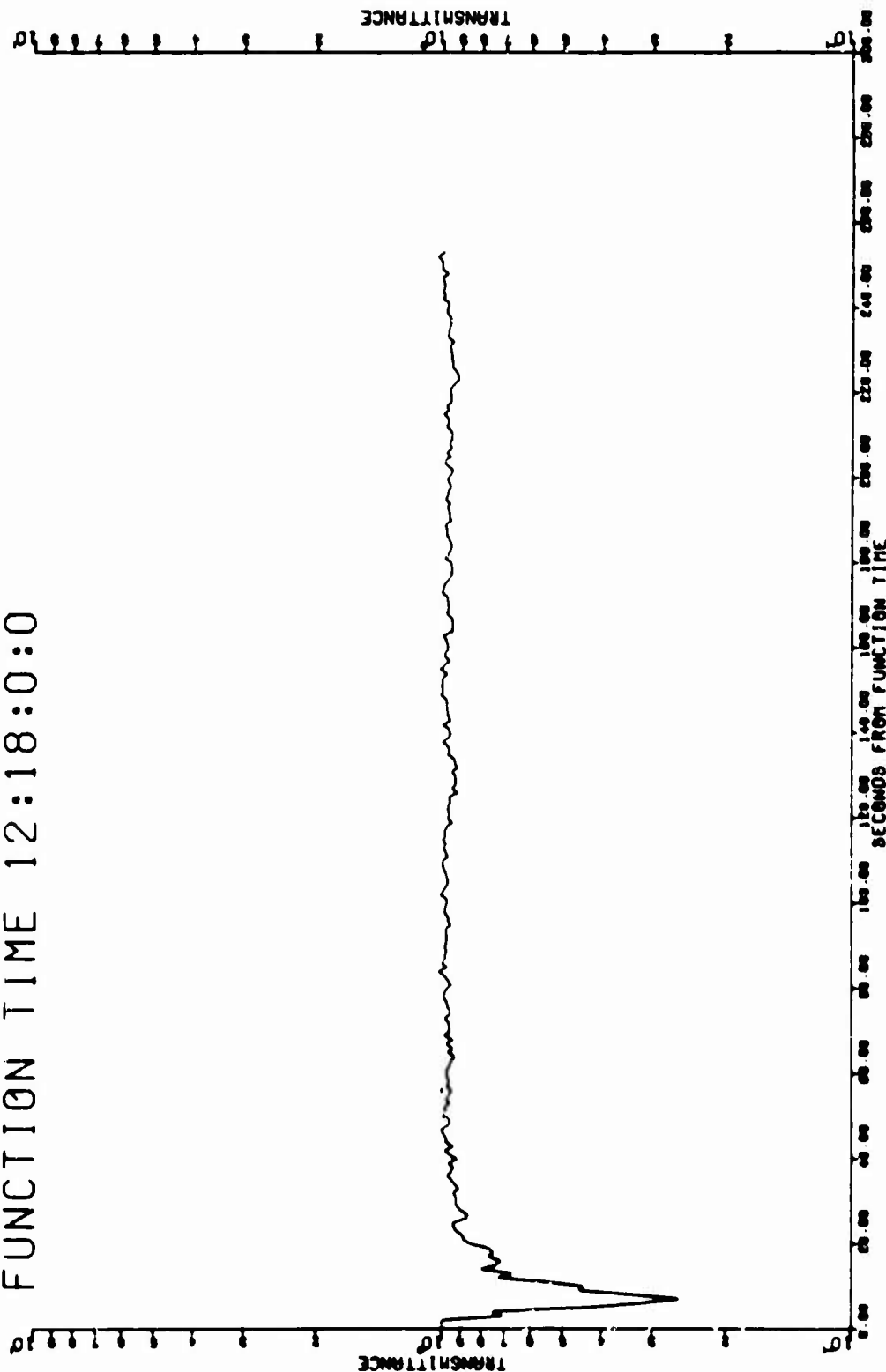
AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 17 (DP-1002), 23 SEP 1977, 12:18:00, WP SMOKE

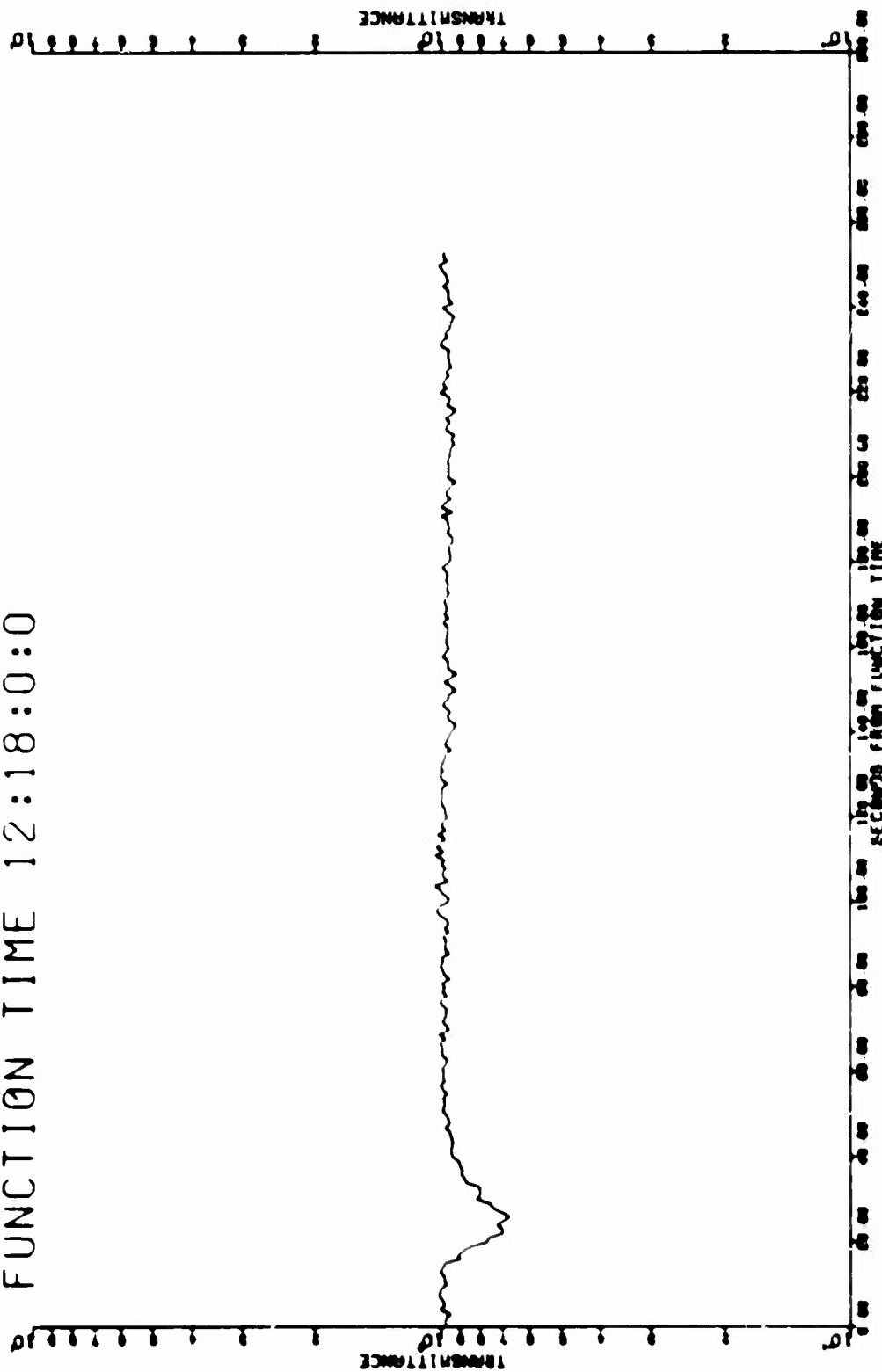
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:0:0



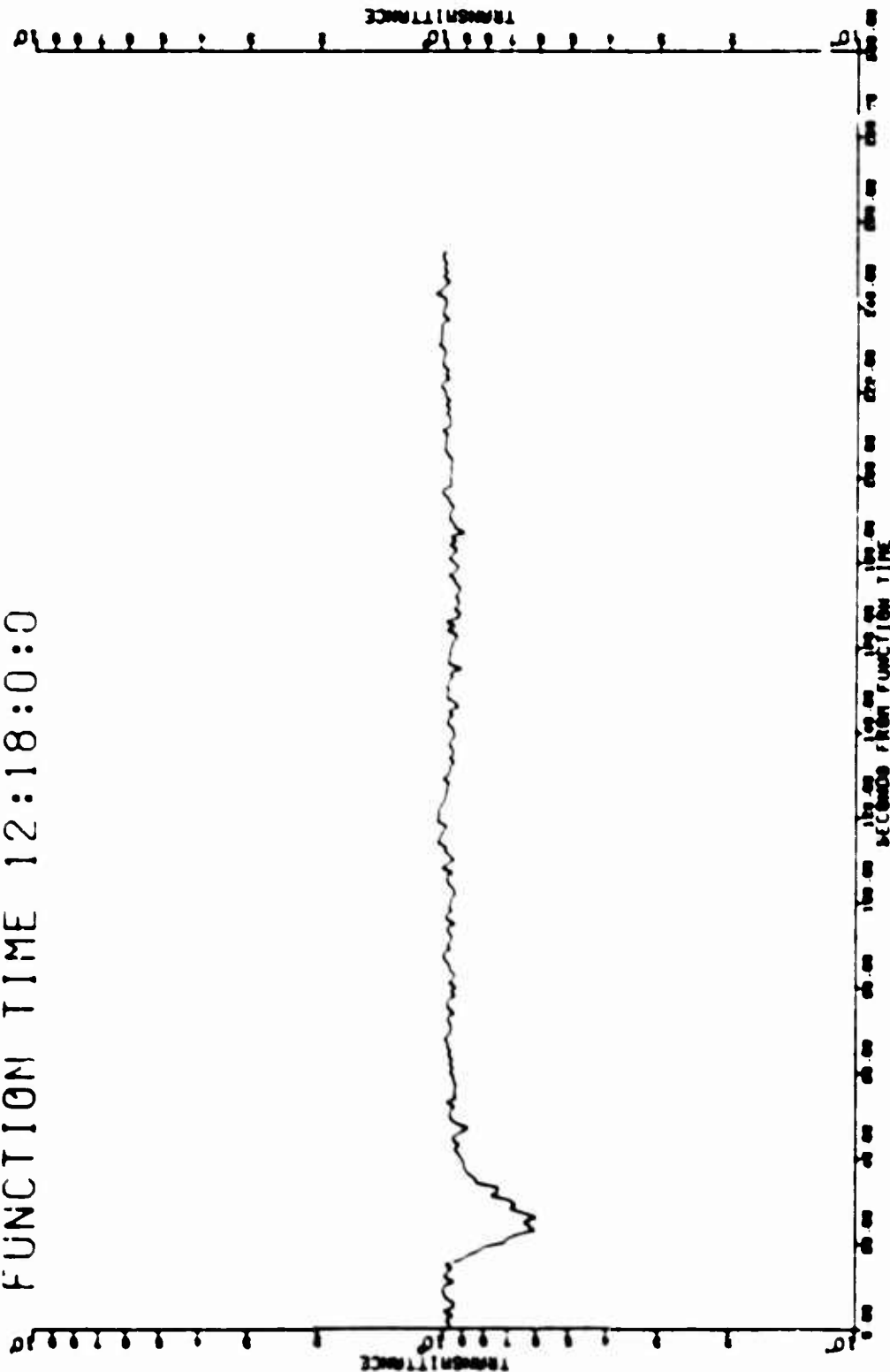
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



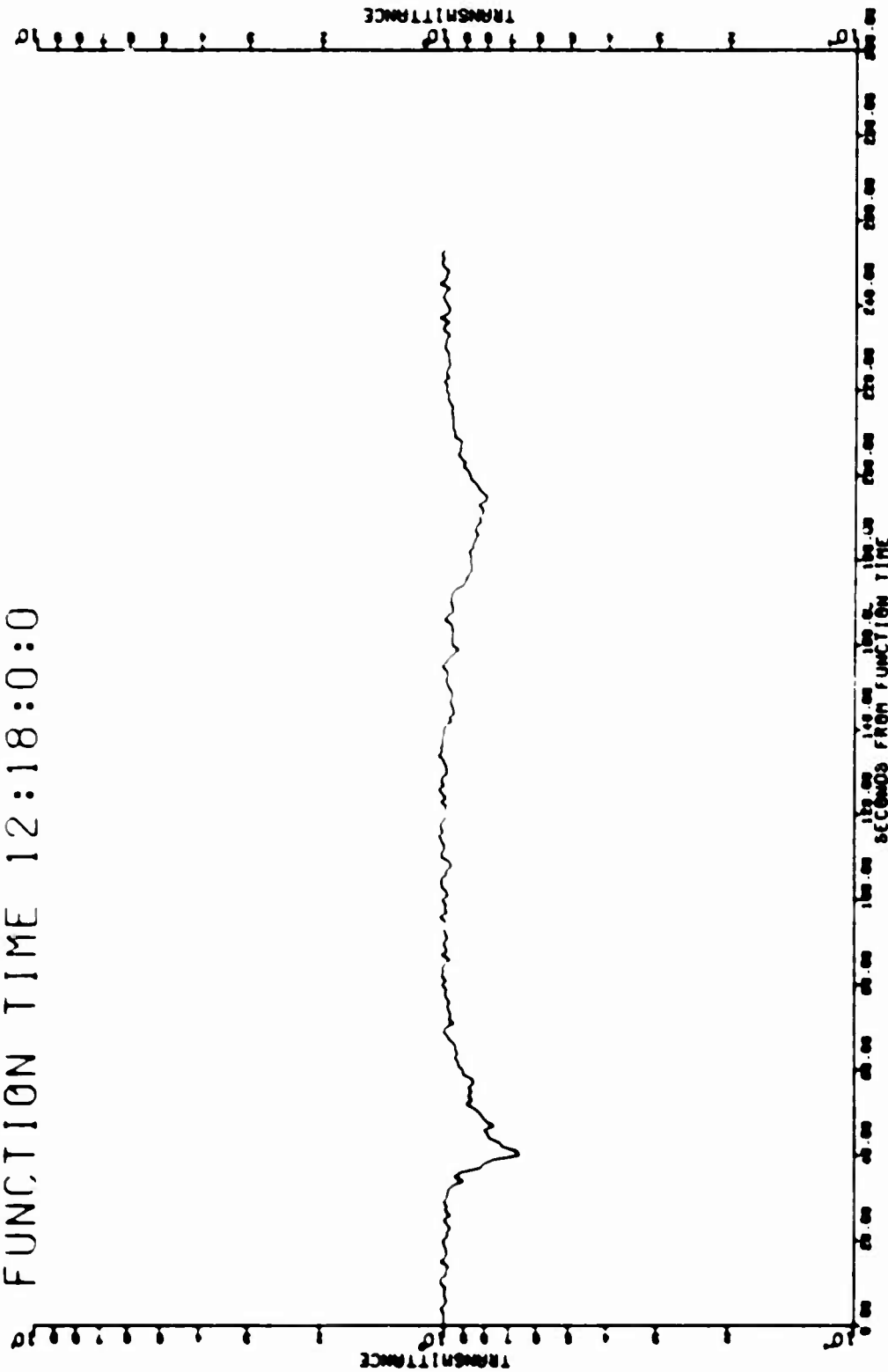
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



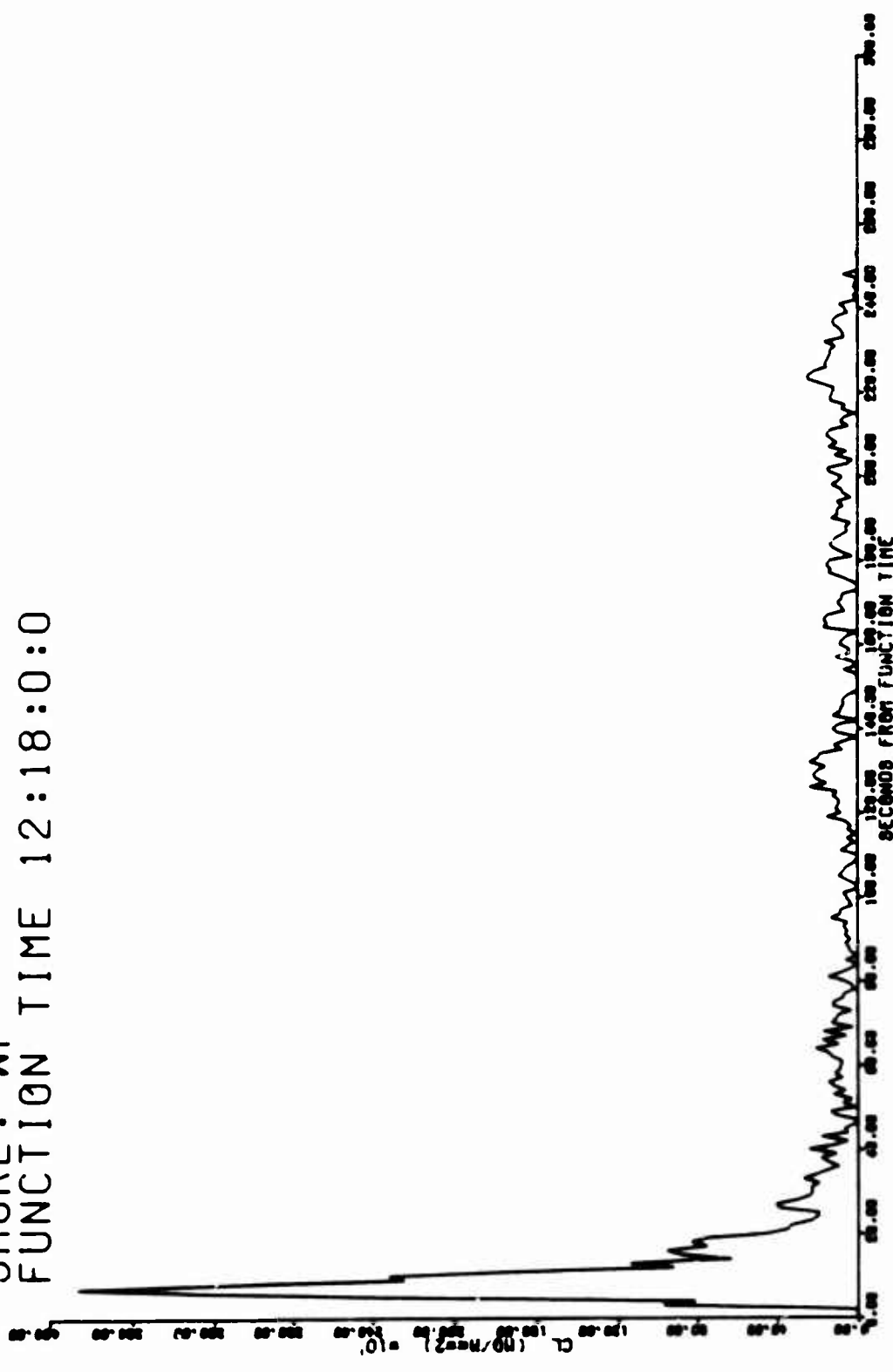
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



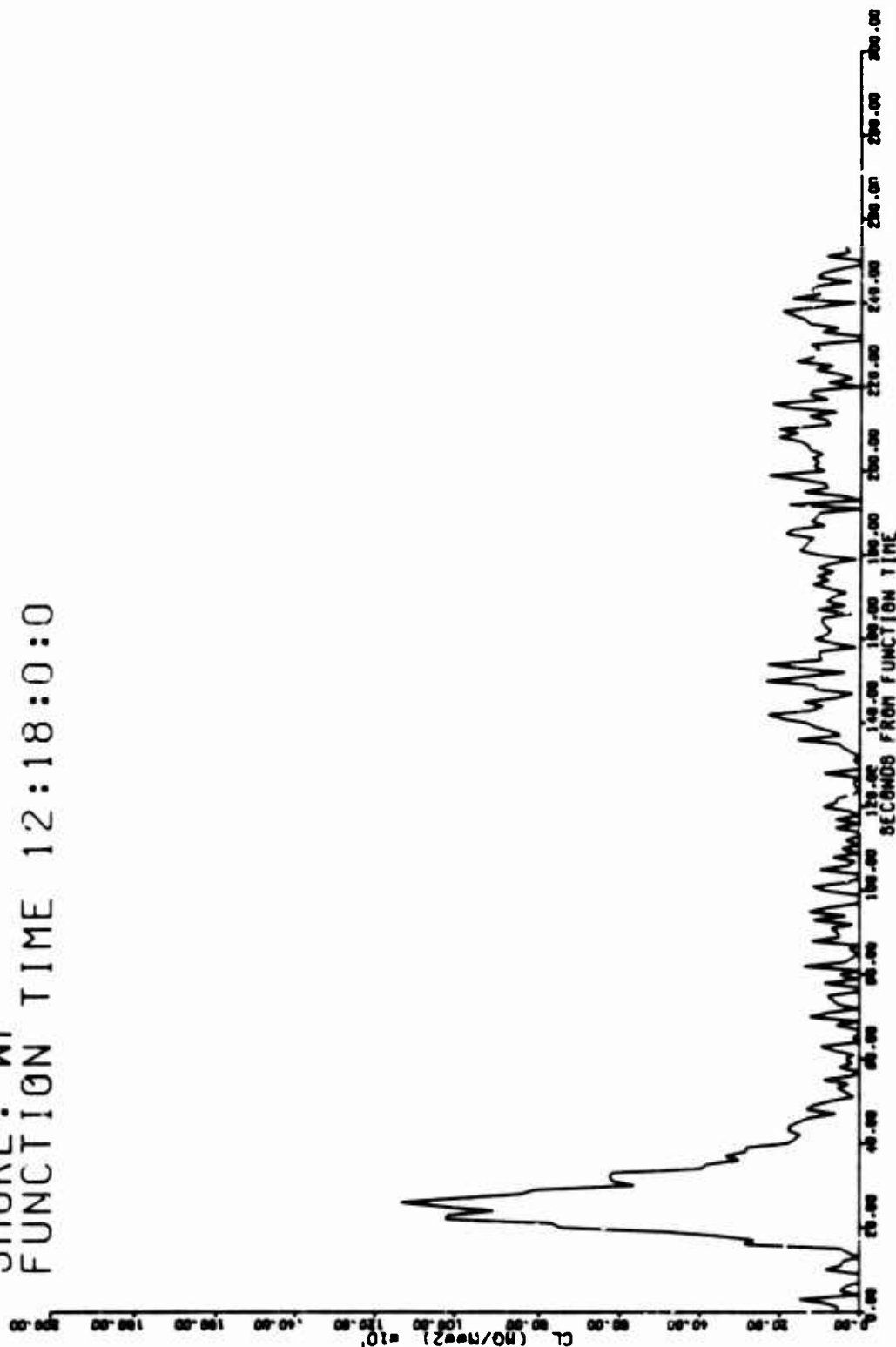
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW 0

TRIAL #17 (OP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:18:0:0



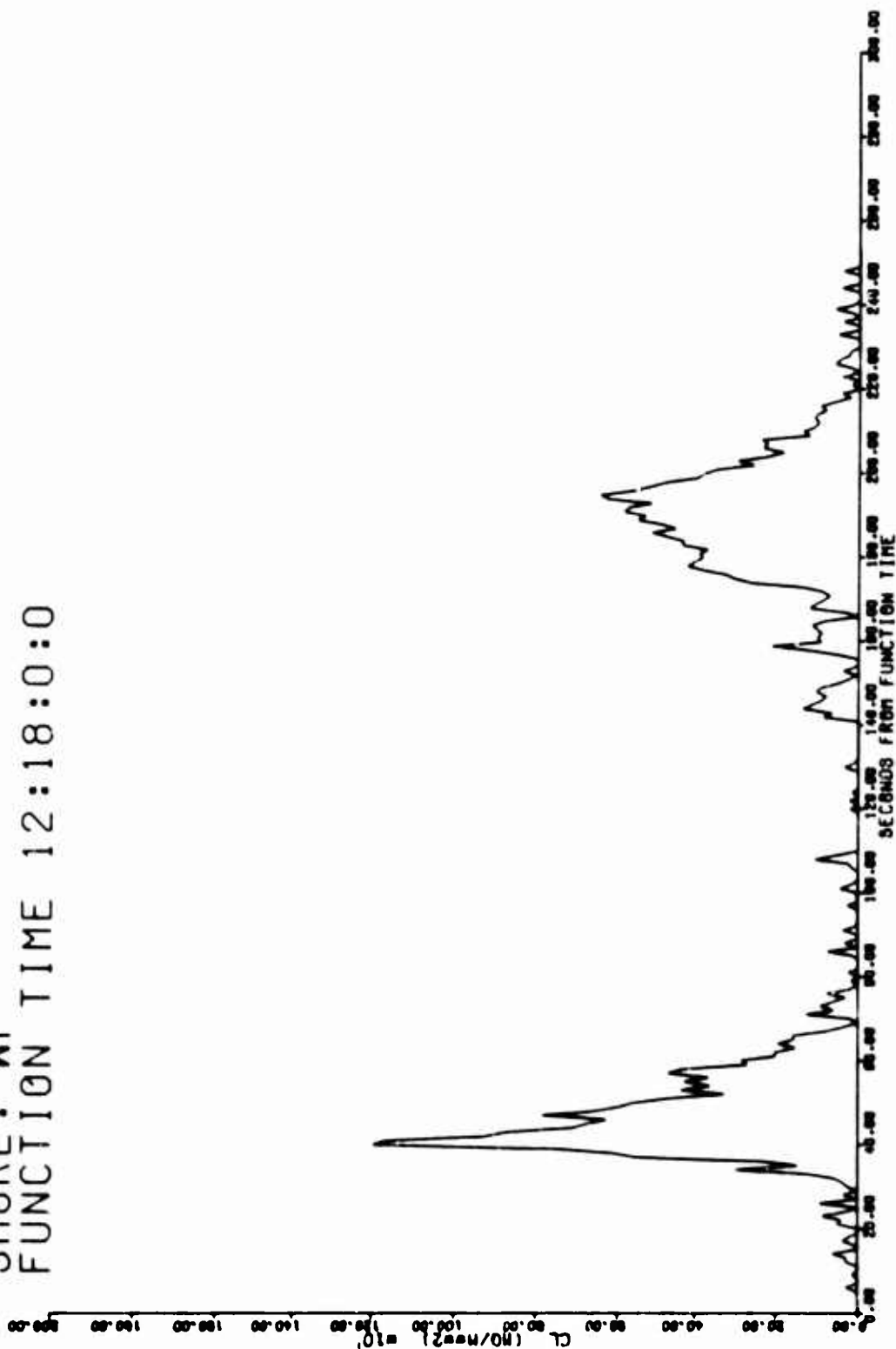
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #17 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:18:0:0



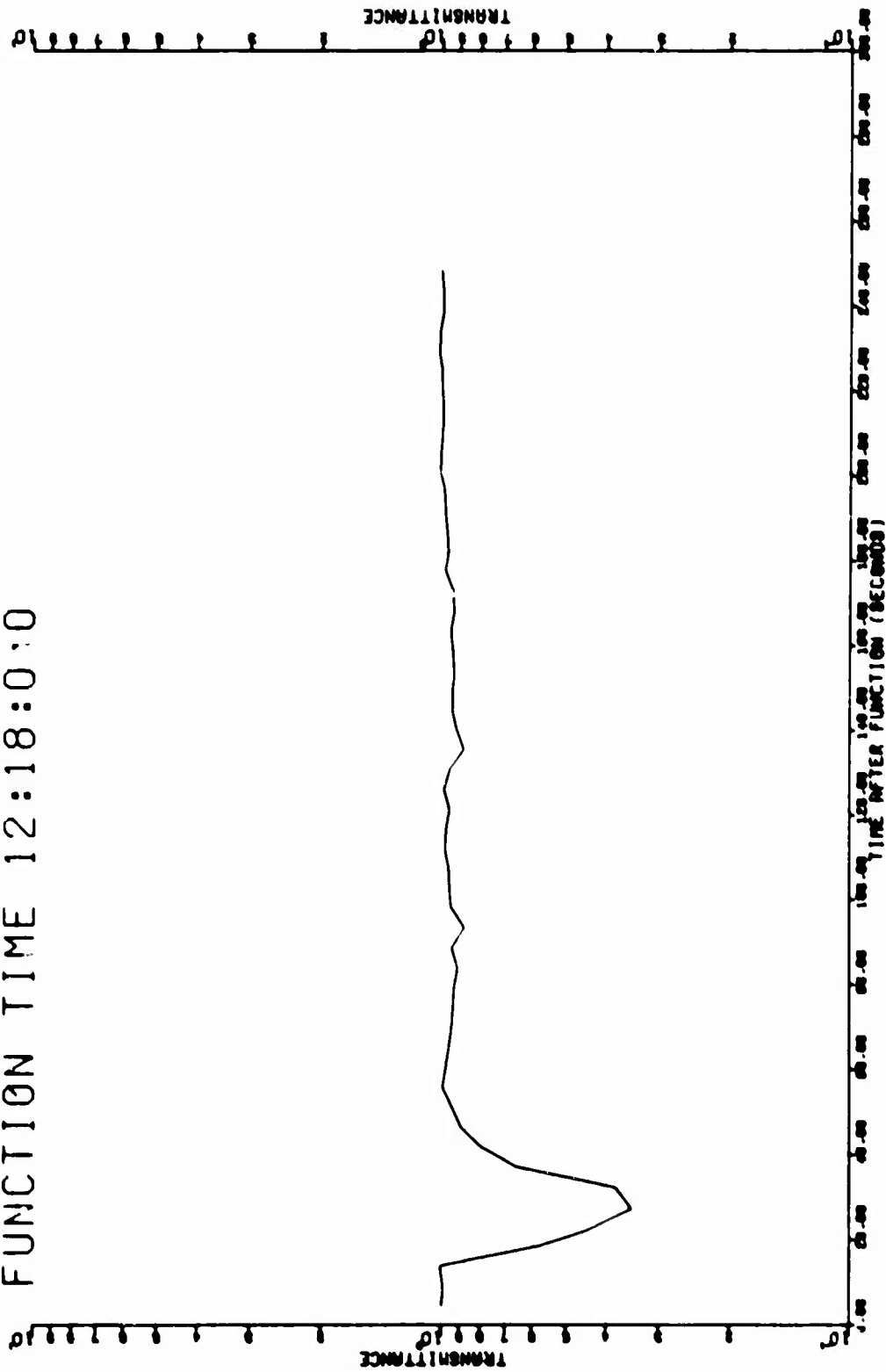
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #17 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:18:0:0



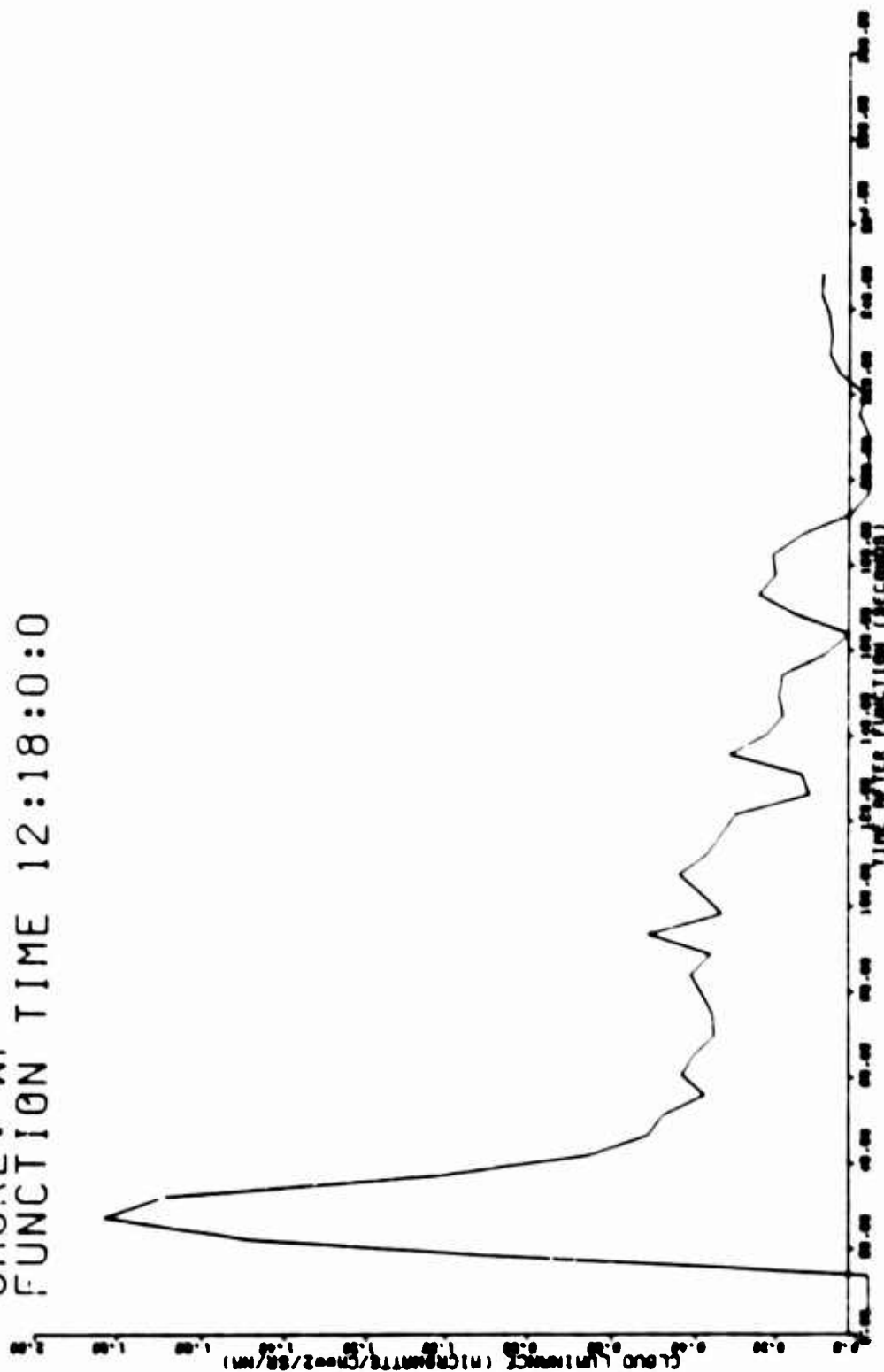
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



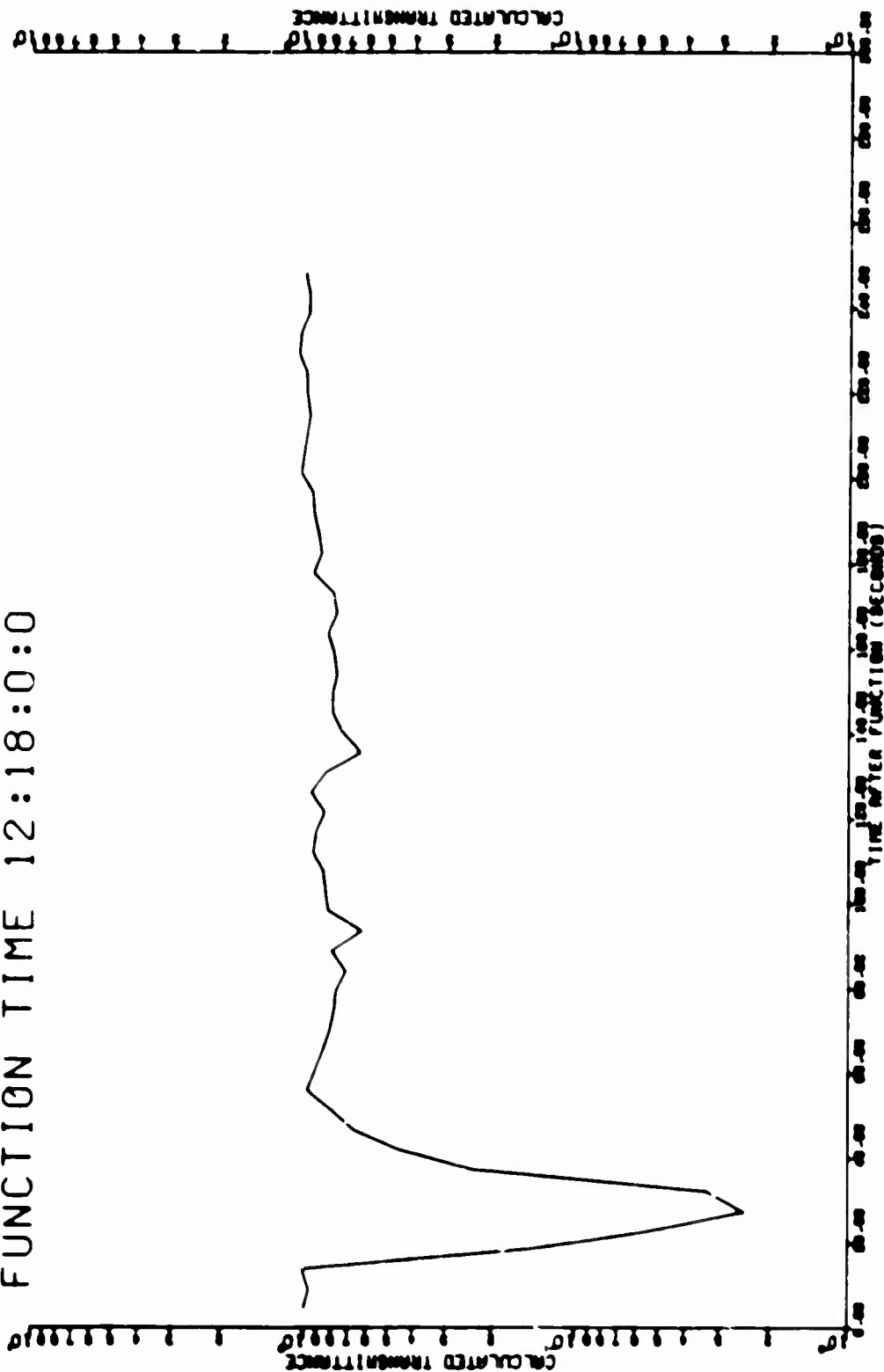
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #17 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 12:18:00



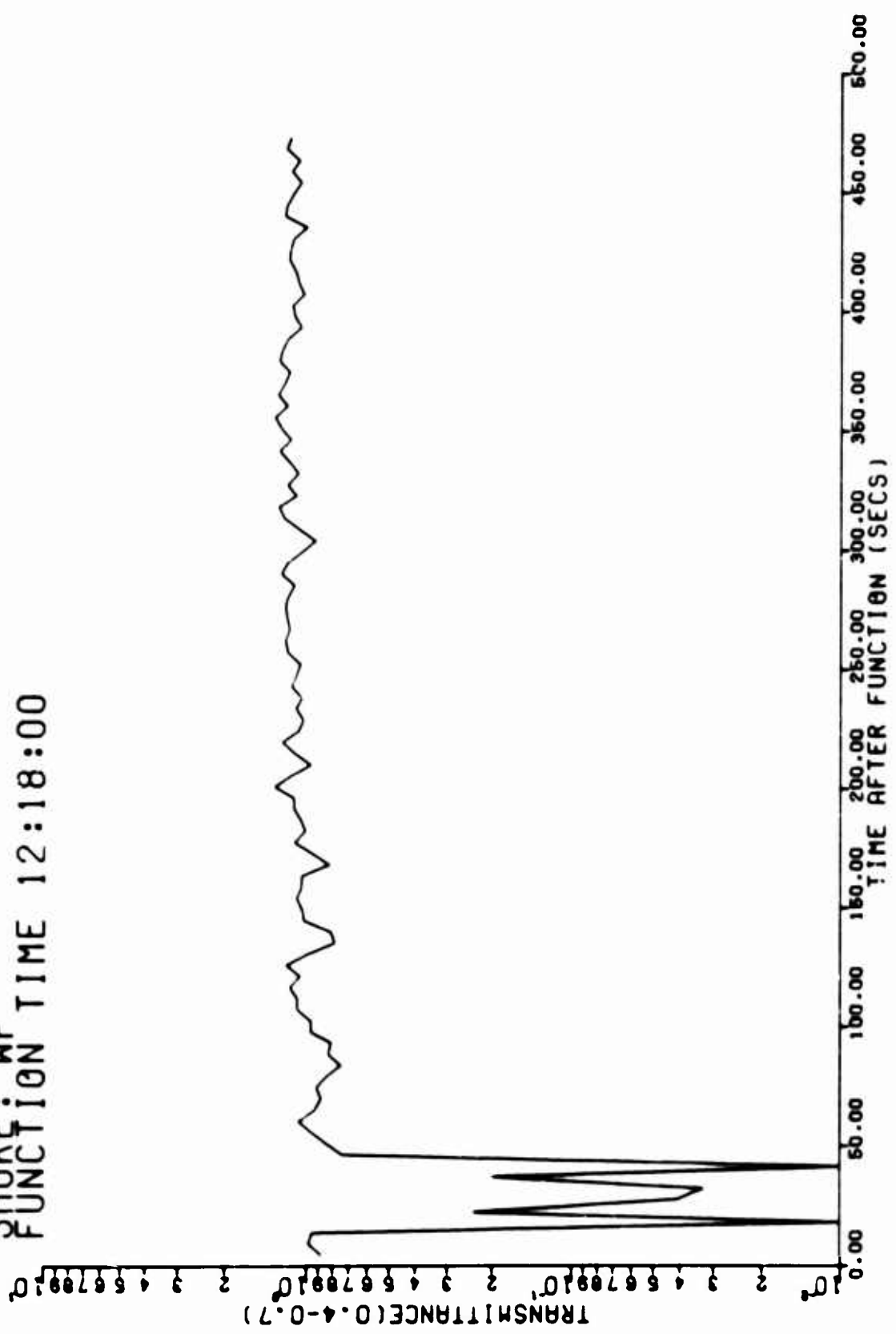
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #17 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:0:0



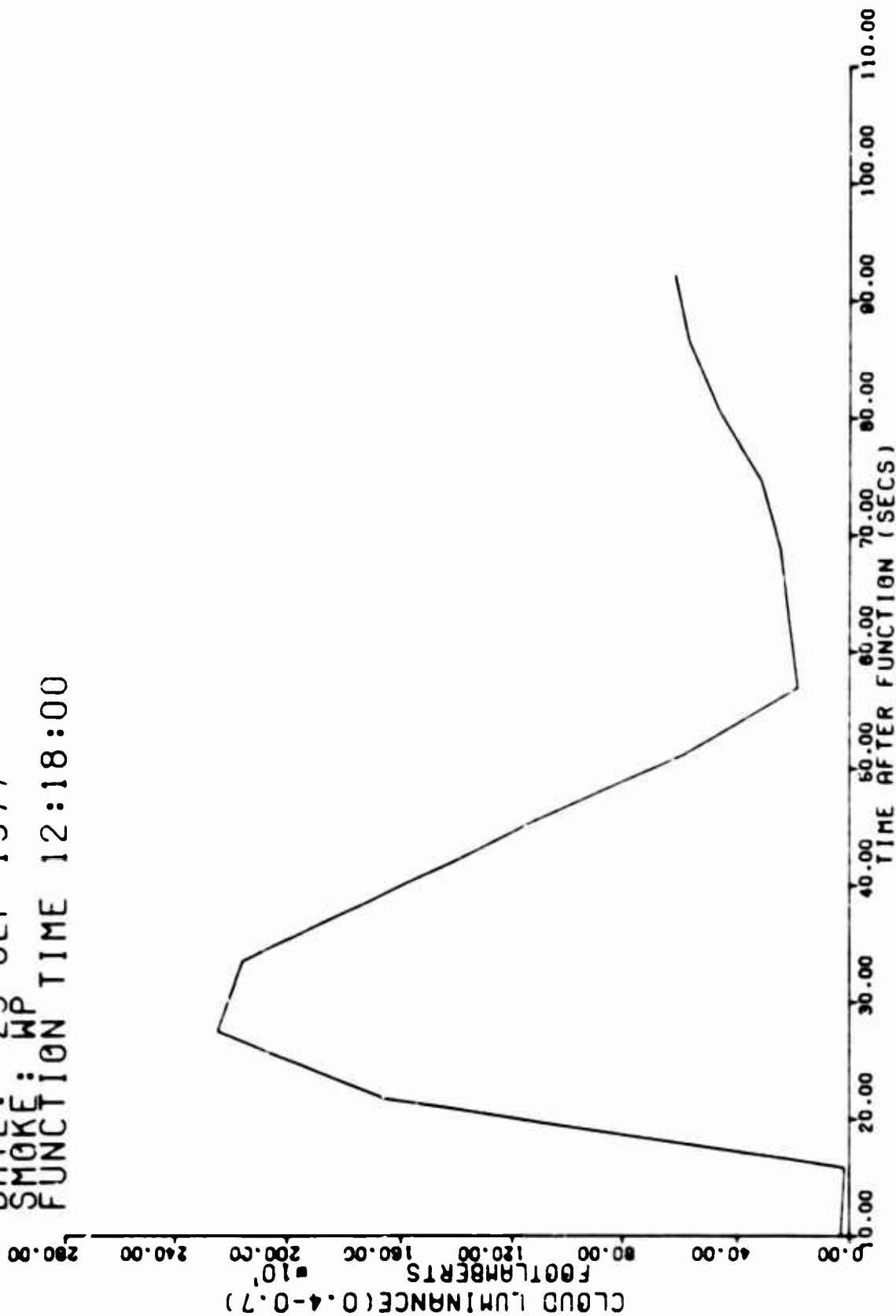
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 17 (DP-1002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
(4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 17 (DP-1002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 12:18:00



CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

APPENDIX B-I-12

TRIAL DP1-002-T-18 (WP SMOKE) 23 SEP 1977

SUMMARY OF TEST DATA	8-I-12-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	8-I-12-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	8-I-12-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	8-I-12-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	8-I-12-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	8-I-12-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	8-I-12-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	8-I-12-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	8-I-12-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	8-I-12-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	8-I-12-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	8-I-12-20
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	8-I-12-21
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	8-I-12-22
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	8-I-12-23

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 ND

FIGURE: PARTICLE SIZE DISTRIBUTION ND

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME ND

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME ND

SUMMARY OF TEST DAY DATA

Trial: 18

Date: 23 Sep 77

Time: 1347 MDT

Wind Direction (Transport) (degrees) (4m)	130
Mean Wind Speed (Transport) (\bar{u} , m/sec)	5.2
Temperature at 2 meters, Trial Time (T, °C)	15.5
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	12.6
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	ND
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.16
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	24
Solar Azimuth (deg)	188.6
Solar Altitude (deg)	49.2
Air Density - ρ (kg m ⁻³)	1.05345
Solar Radiation (Langleys per minute)	1.325
Barometric Pressure (millibars)	868.5
Visibility (km)	137
Reflectivity, OD Target	0.11
Haze (footlamberts)	40
Brightness, Background (footlamberts)	1027
Brightness, White Target (footlamberts)	1346
Brightness, OD Target	185
Percent Opaque Cloud Cover	2

Munitions/Submunitions Used (WP, 81mm) 3

Number of Munitions/Submunitions Functioned 3

Particle Size Range (micron) *

(0.3 - 0.4)

(0.4 - 0.6)

(0.6 - 0.8)

(0.8 - 1.0)

(1.0 - 1.5)

(1.5 - 3.0)

Log₁₀N_{MD}

^oLog₁₀N_{MD}

N_{MD}

N_{MD}

*No data available

Initial Cloud Dimensions (Meters) *

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
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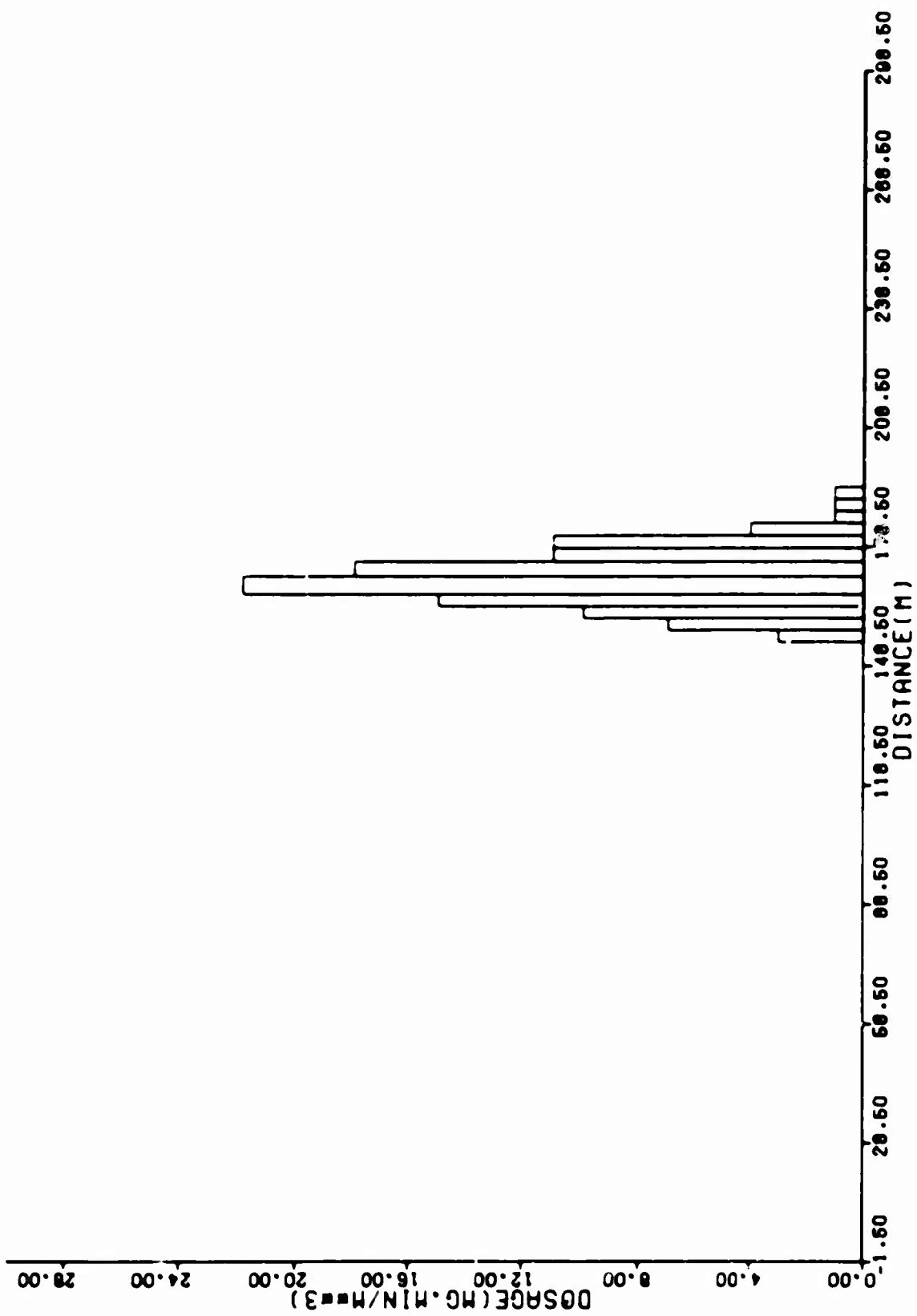
*No data - camera malfunction

SKY BRIGHTNESS

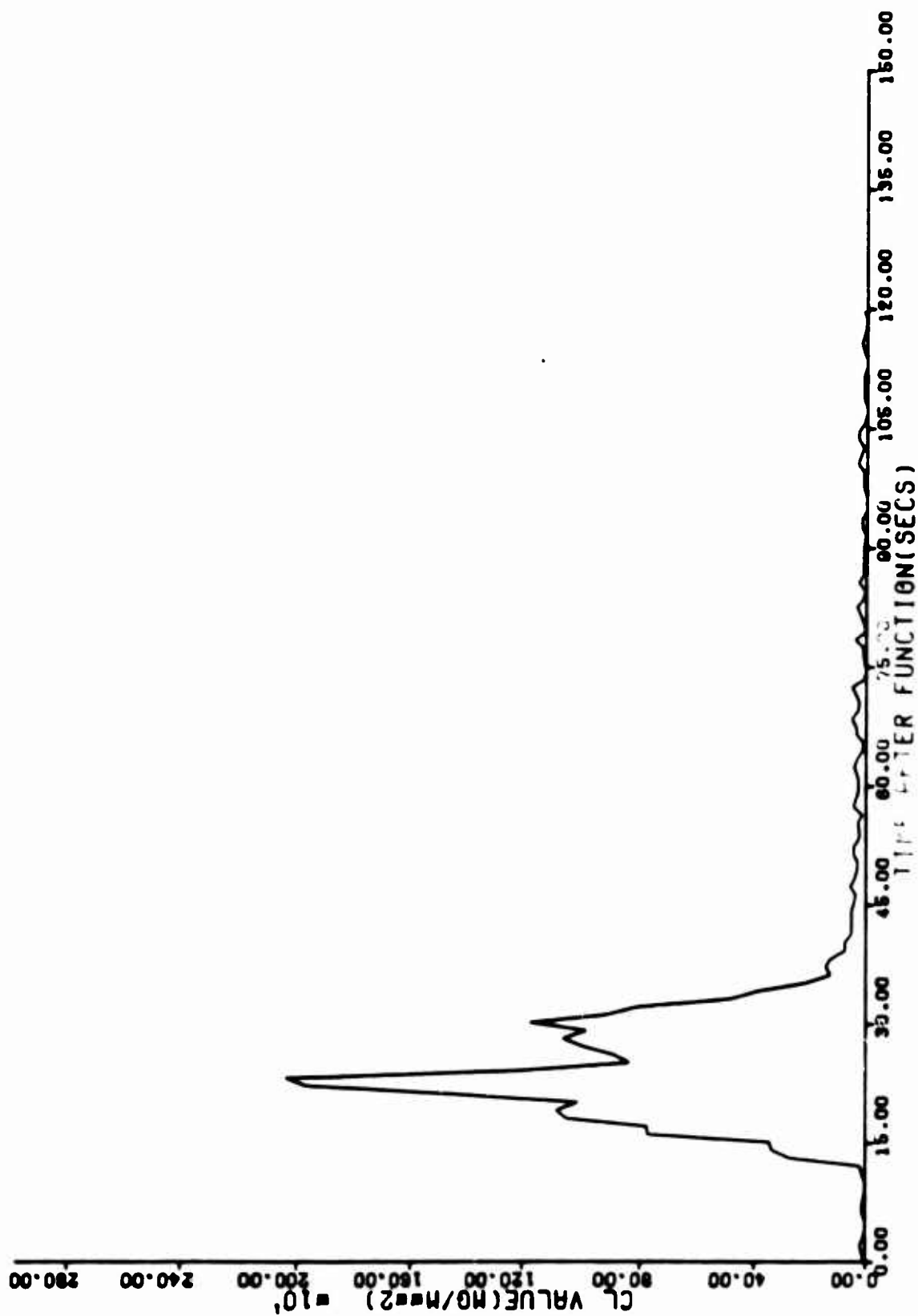
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	652
5	1300
10	2212
15	2668
20	2668
25	2668
30	2668
35	2668
40	2328
45	2212

Viewing azimuth 240° except 255° at 0 degrees elevation

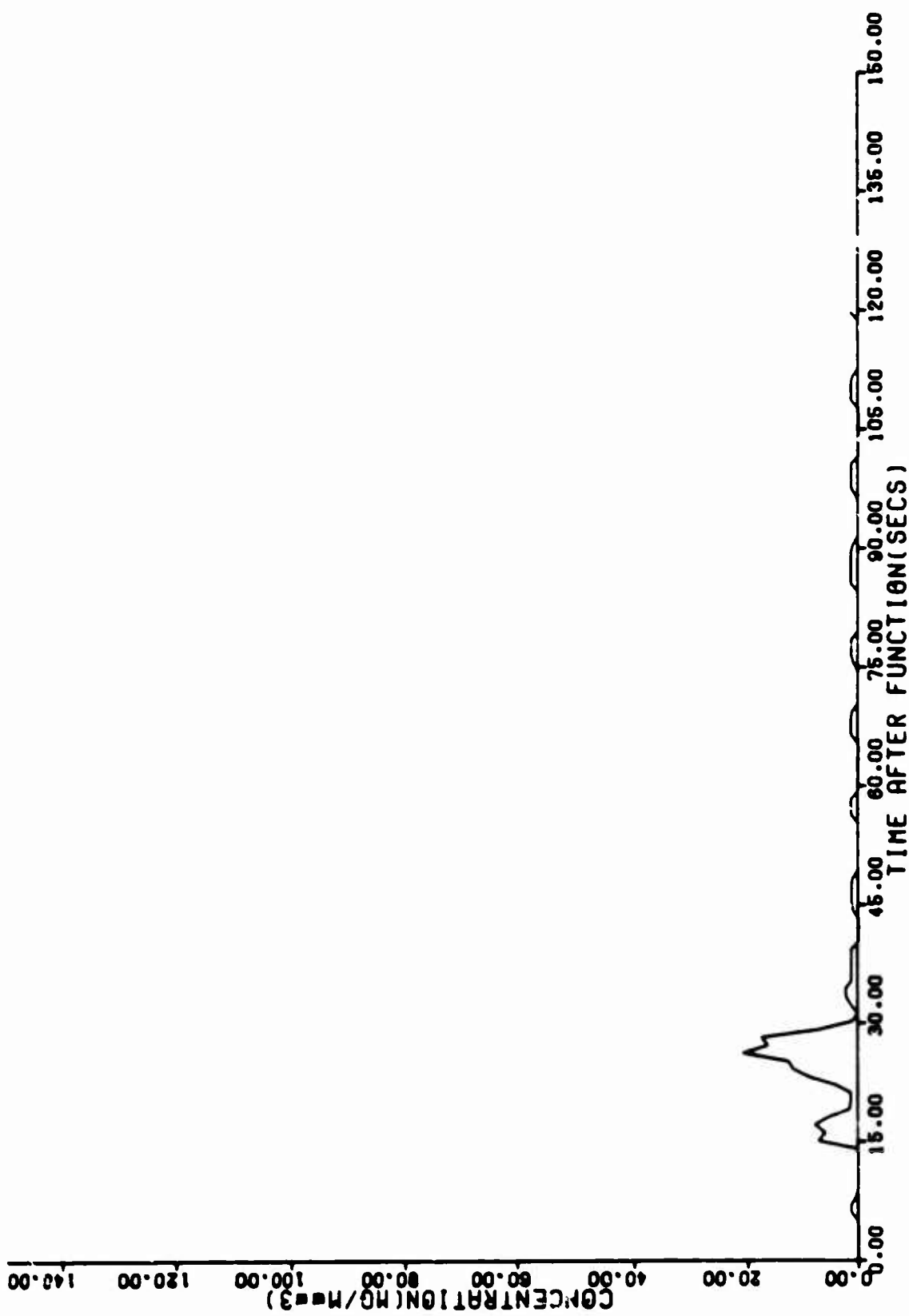


TRIAL 18 (DP-1002), 23 SEP 1977, 13:47:00, WP SMOKE



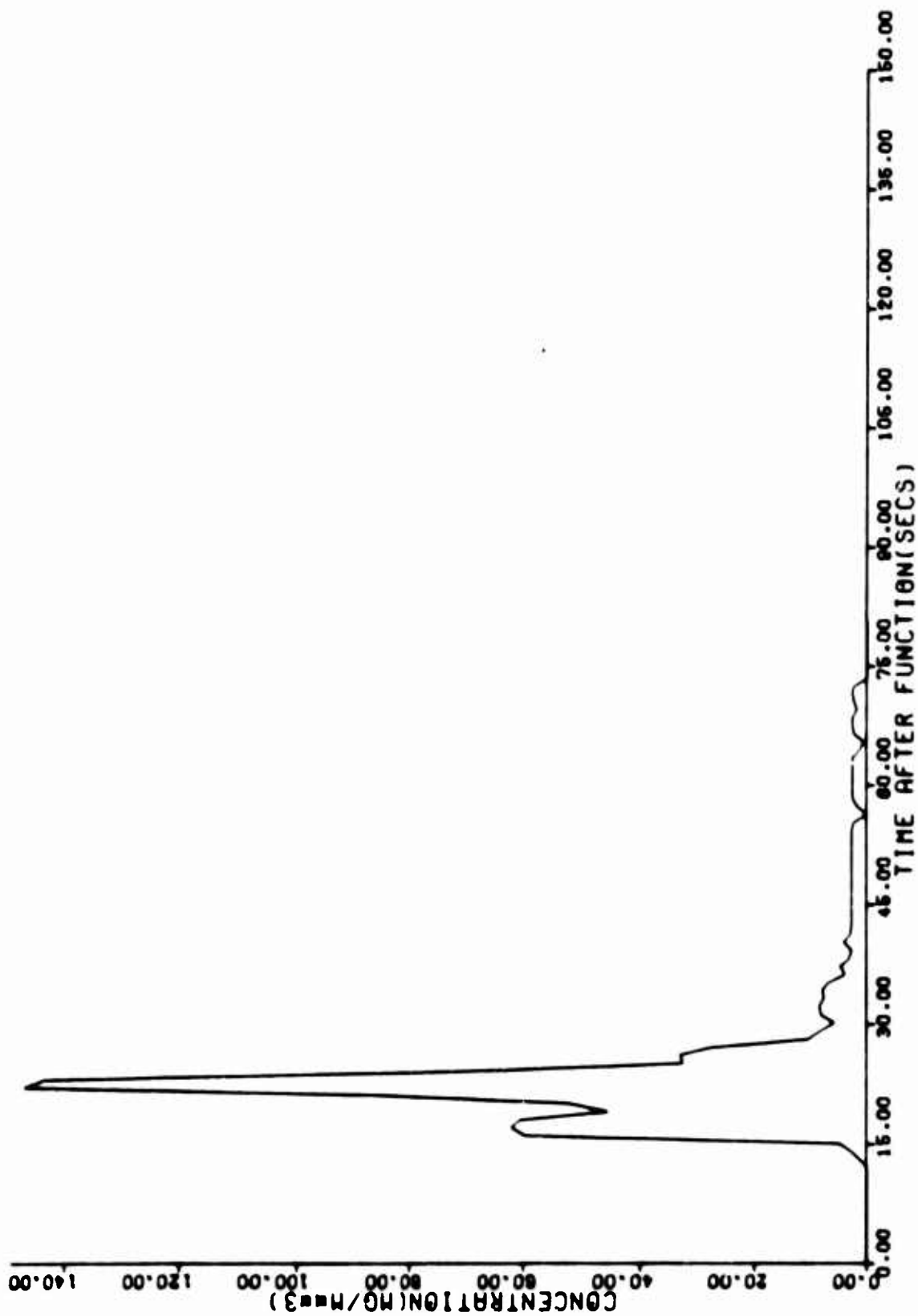
TRIAL 18 (DP-1002). 23 SEP 1977. 13:47:00. WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



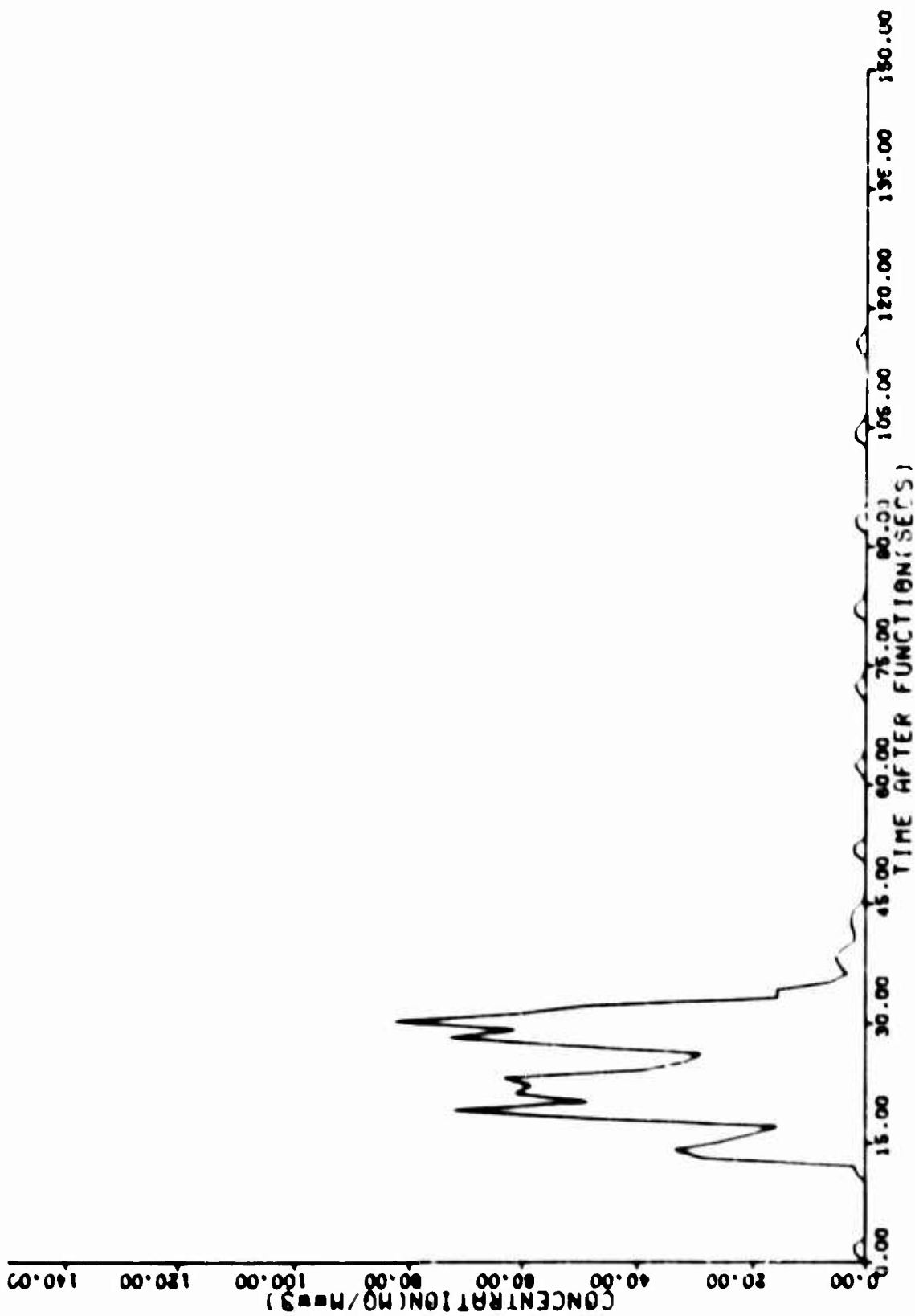
TRIAL 18 (DP-1002), 23 SEP 1977, 13:47:00, WP SMOKE

EROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



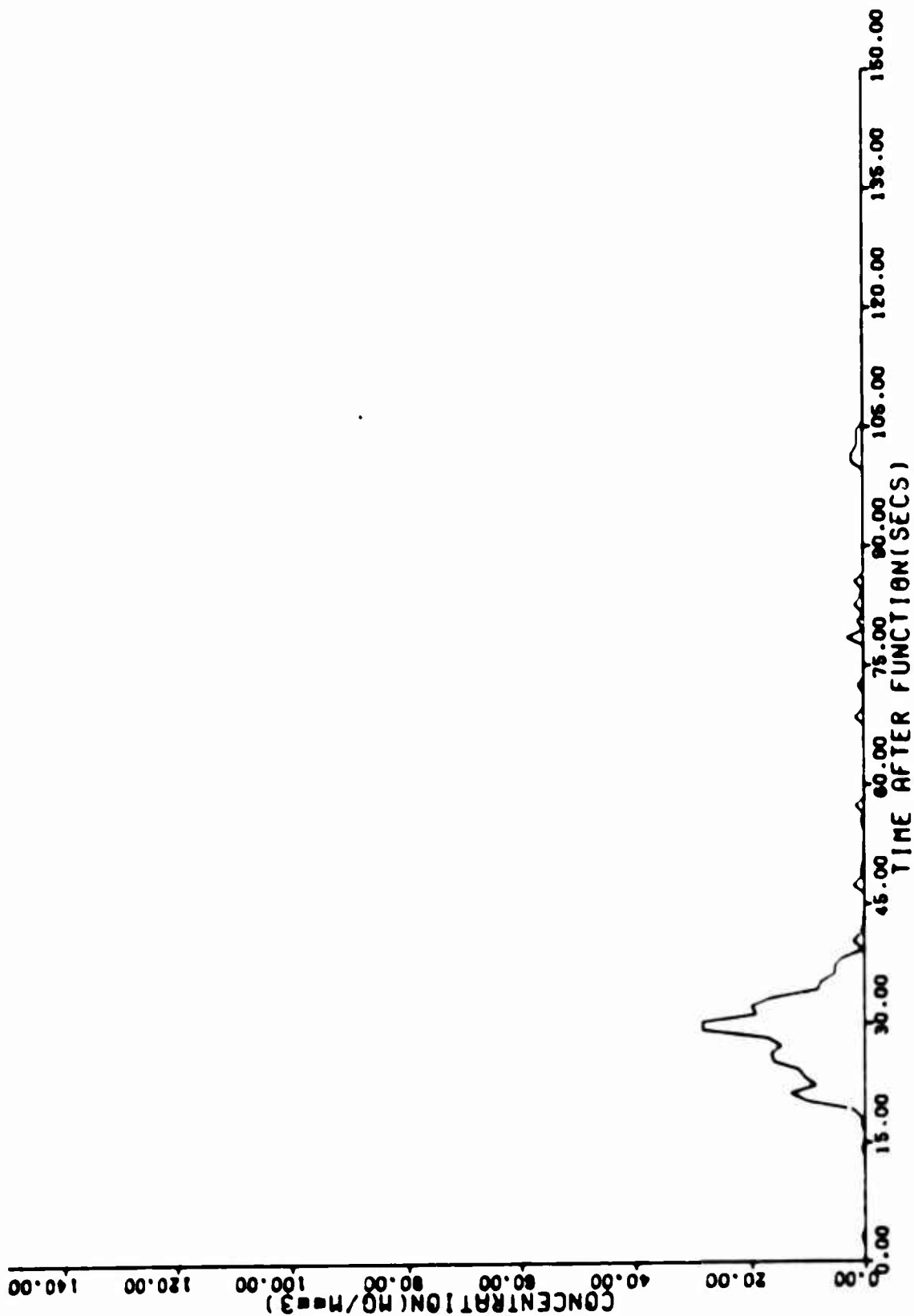
TRIAL 18 (DP-1002), 23 SEP 1977, 13:47:00, WP SMOKE

AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



TRIAL 18 (DP-10U2). 23 SEP 1977. 13:47:00. WP SMOKE

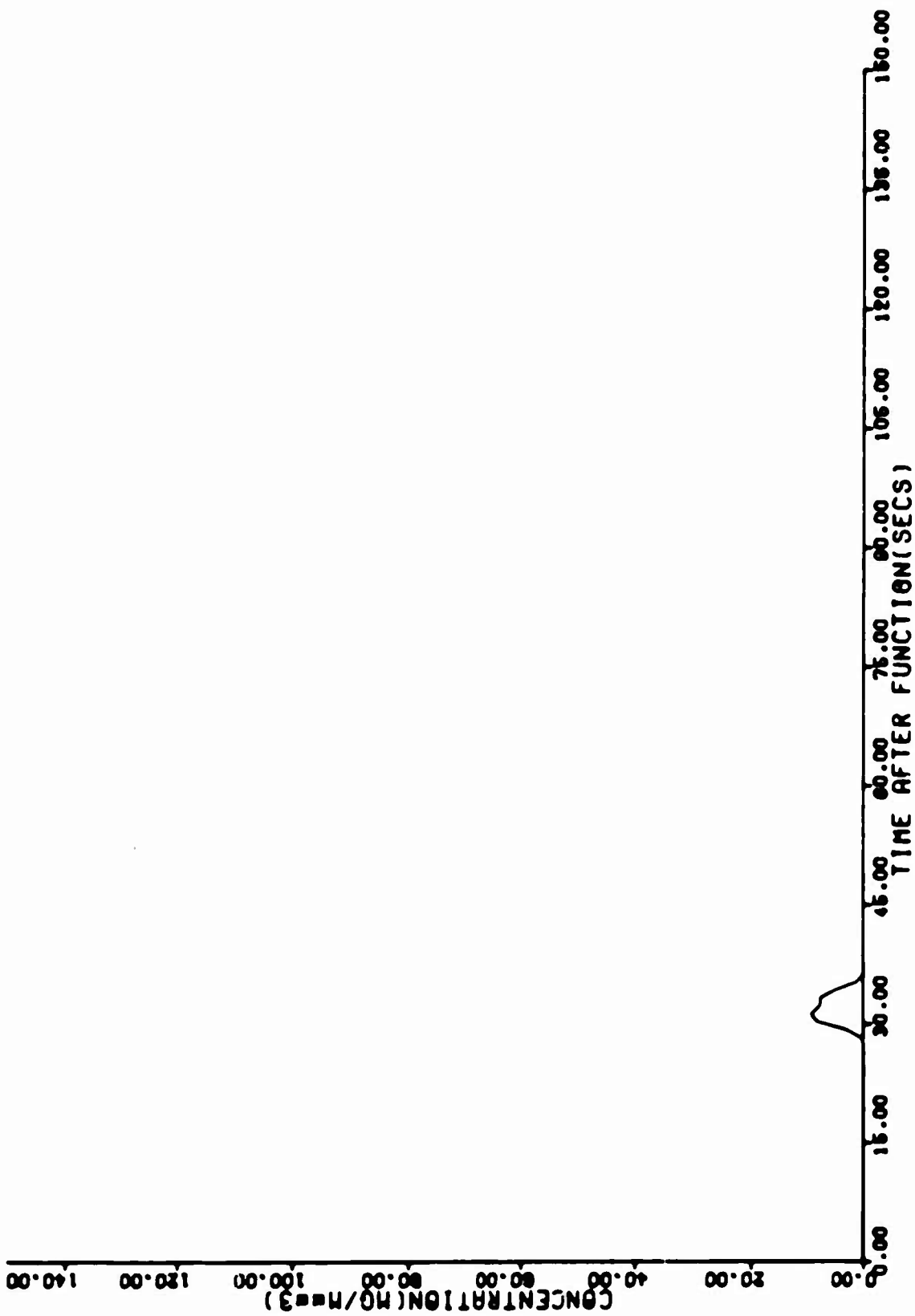
HEROSOL PHOTOMETER #13. X=0.00. Y=174.00. Z=0.00



TRIAL 18 (DP-1002). 23 SEP 1977. 13:47:00. WP SMOKE

AEROSOL PHOTOMETER #14. X=0.00. Y=183.00. Z=0.00

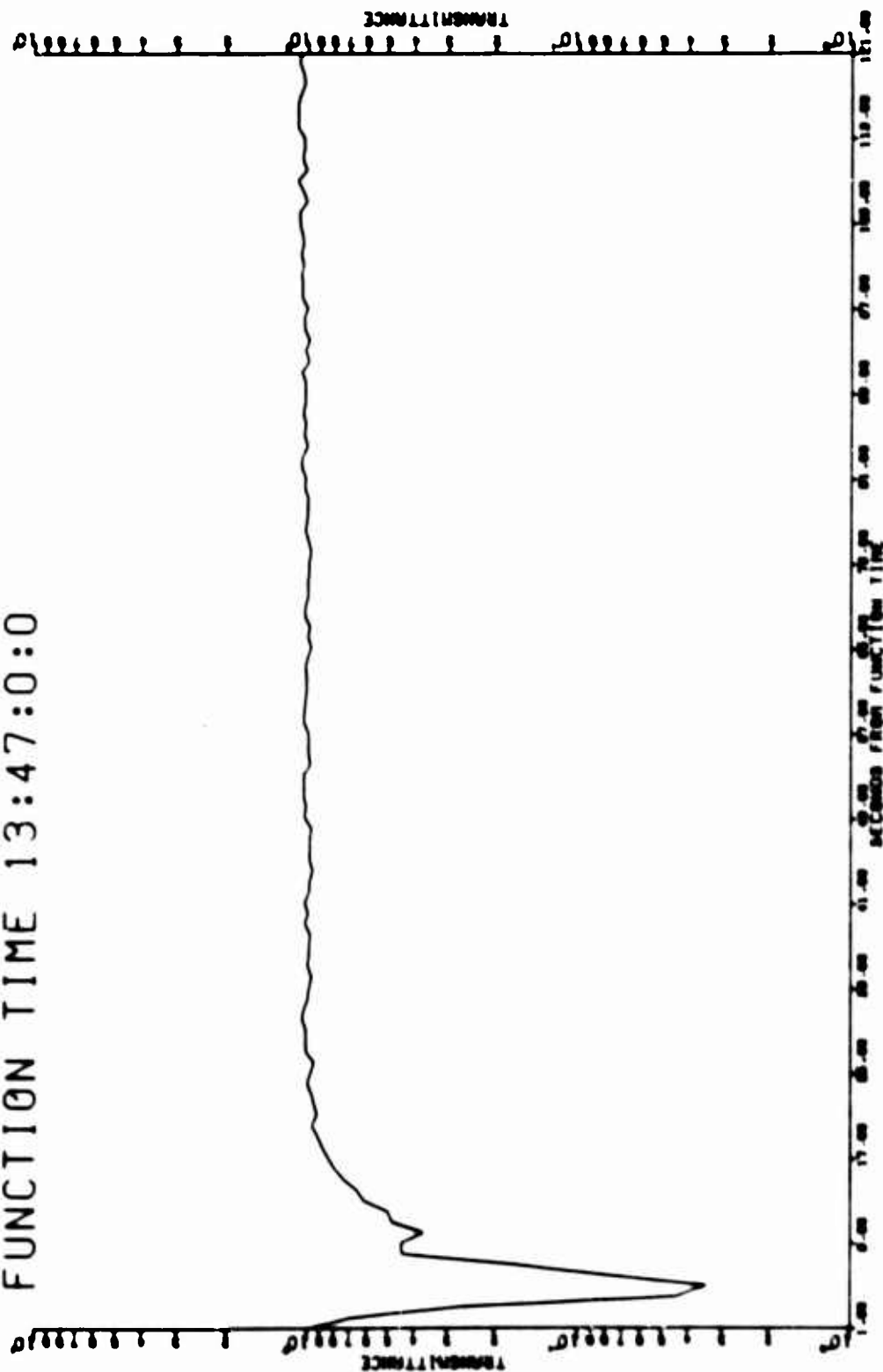
8-1-12-12



TRIAL 18 (DP-1002), 23 SEP 1977, 13:47:00, WP SMOKE

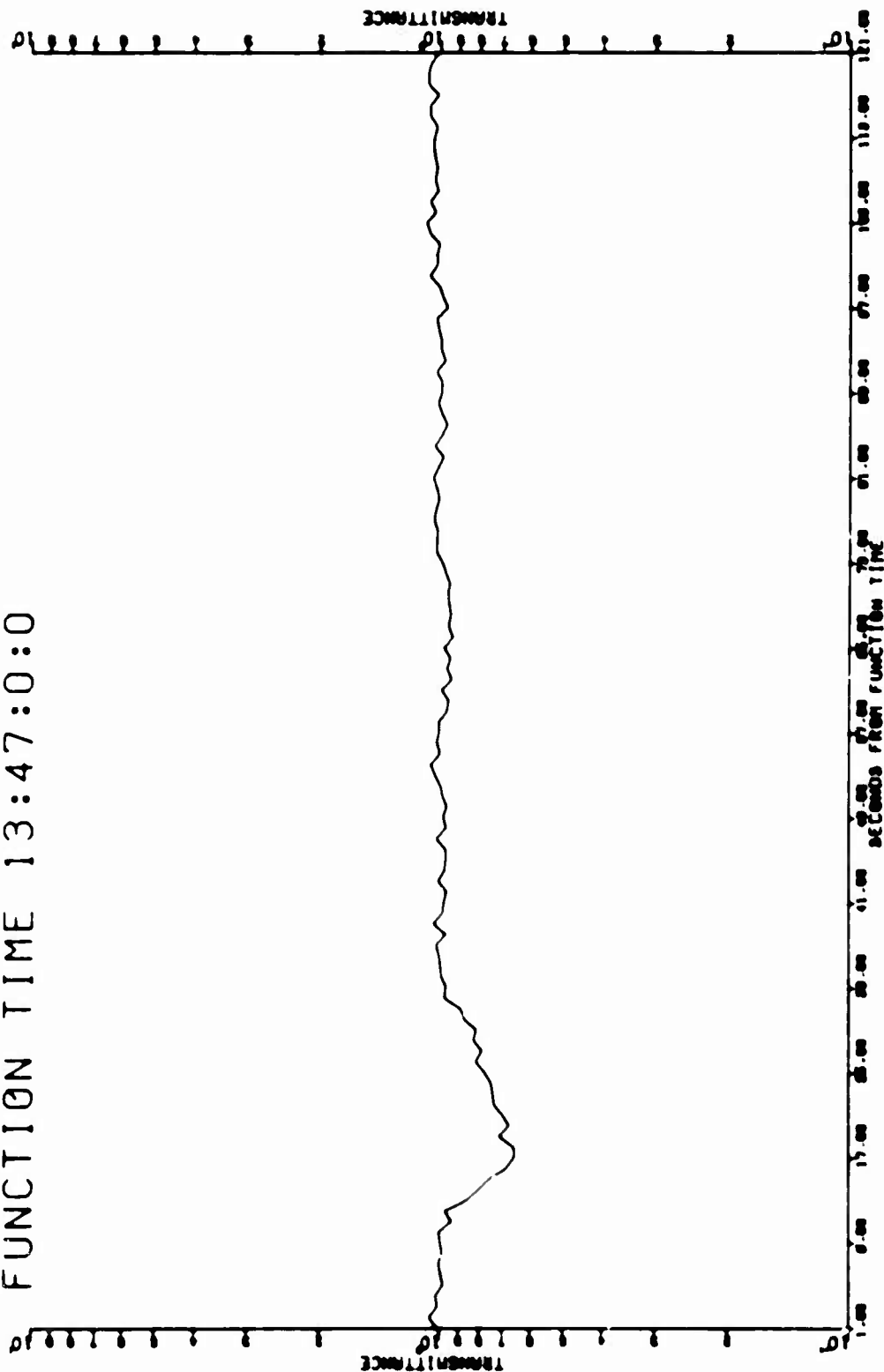
AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00

TRIAL #18 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:47:0:0



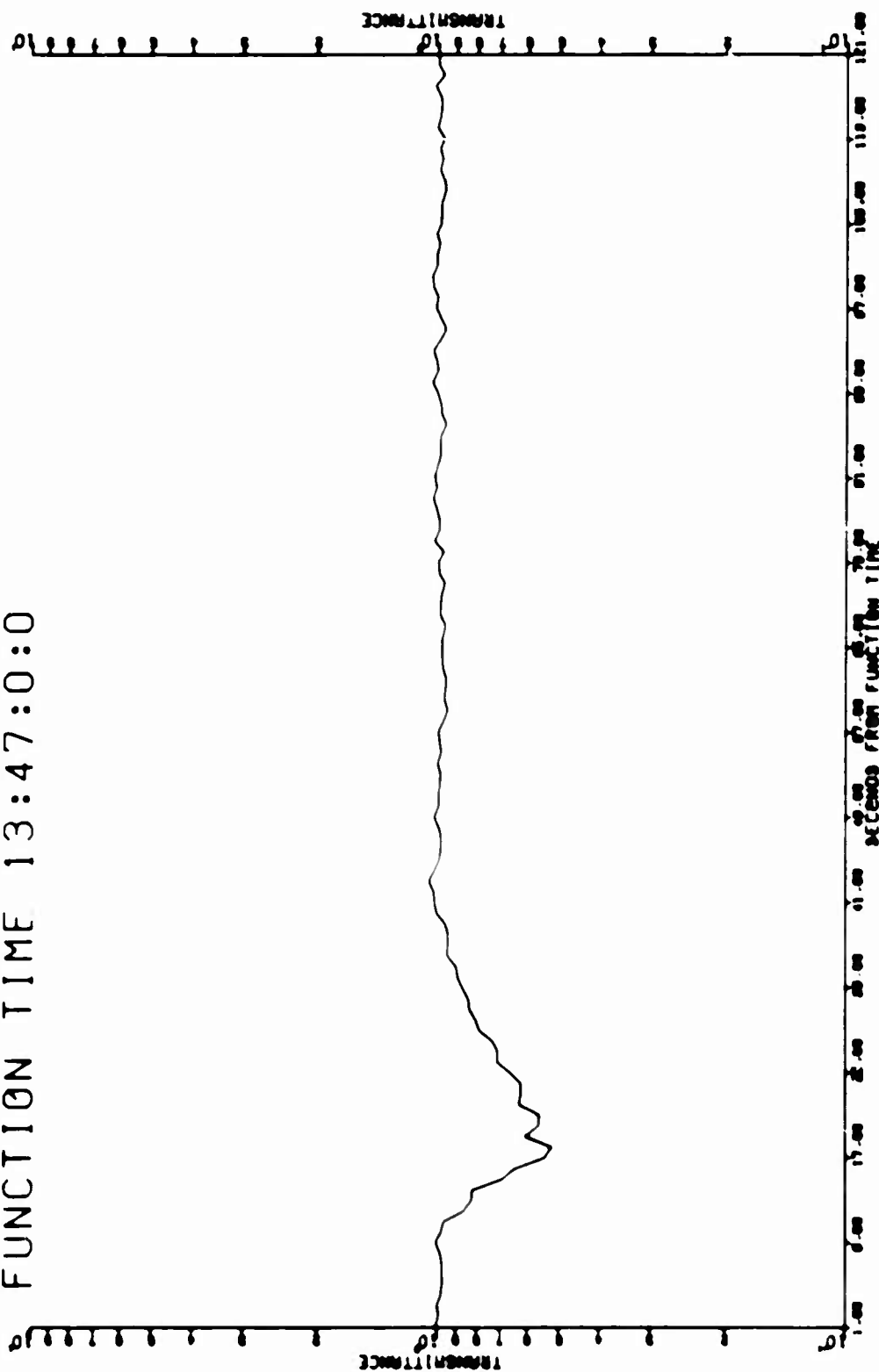
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



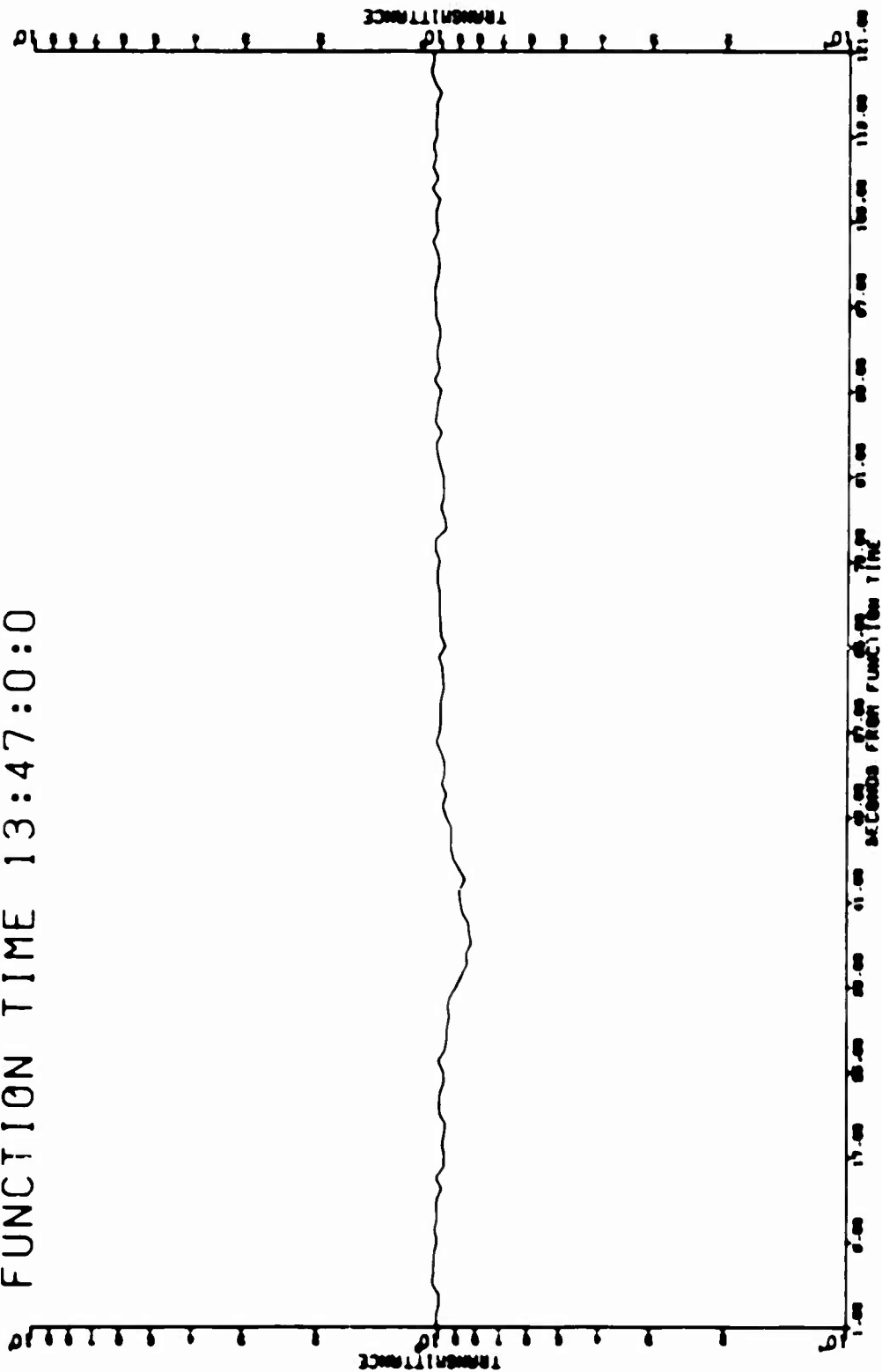
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WF
 FUNCTION TIME 13:47:0:0



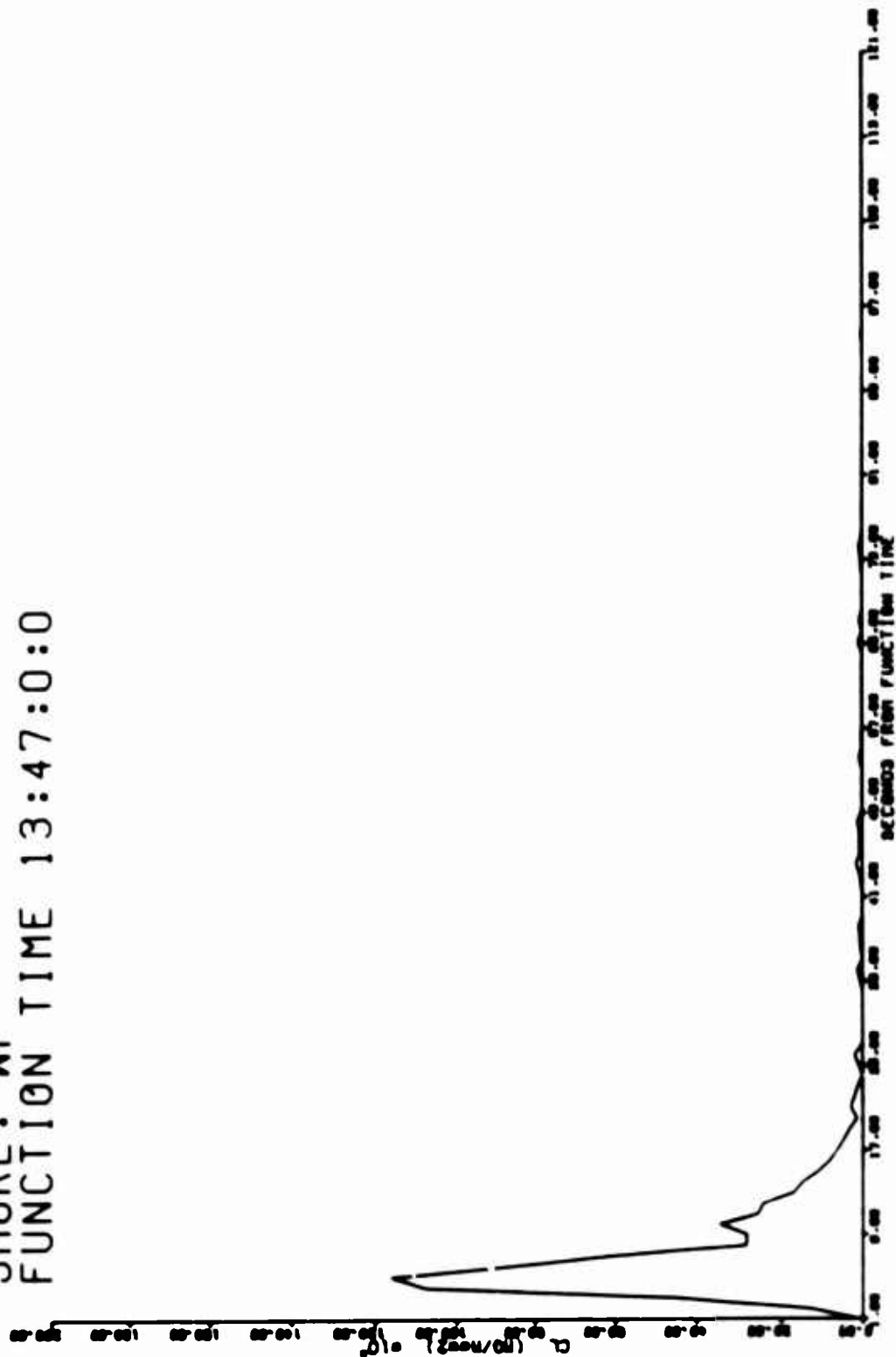
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #18 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:47:0:0



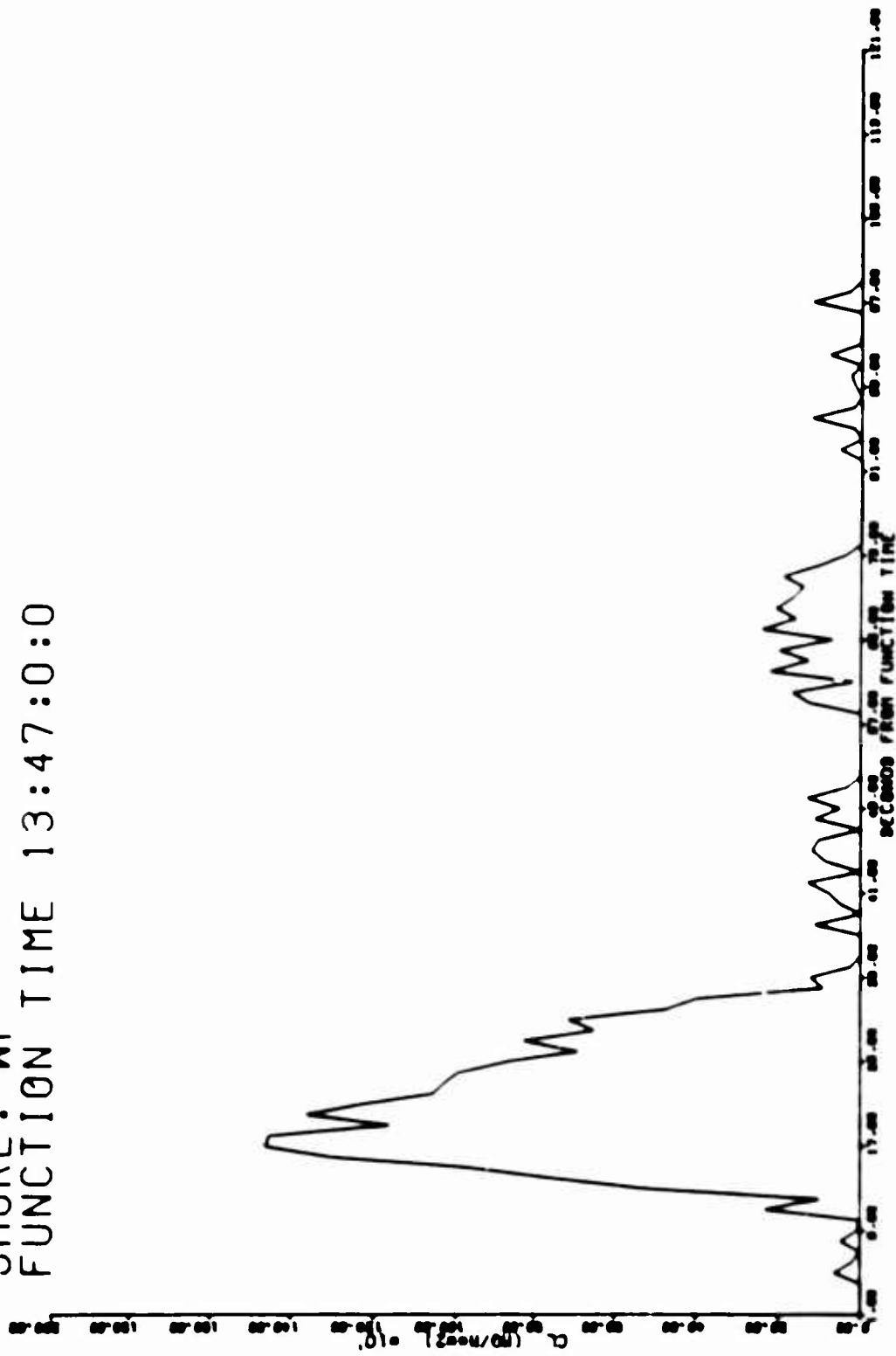
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #18 (DP1-002)
DATE: 23 SEP 1977
SMOKE: WP
FUNCTION TIME 13:47:0:0



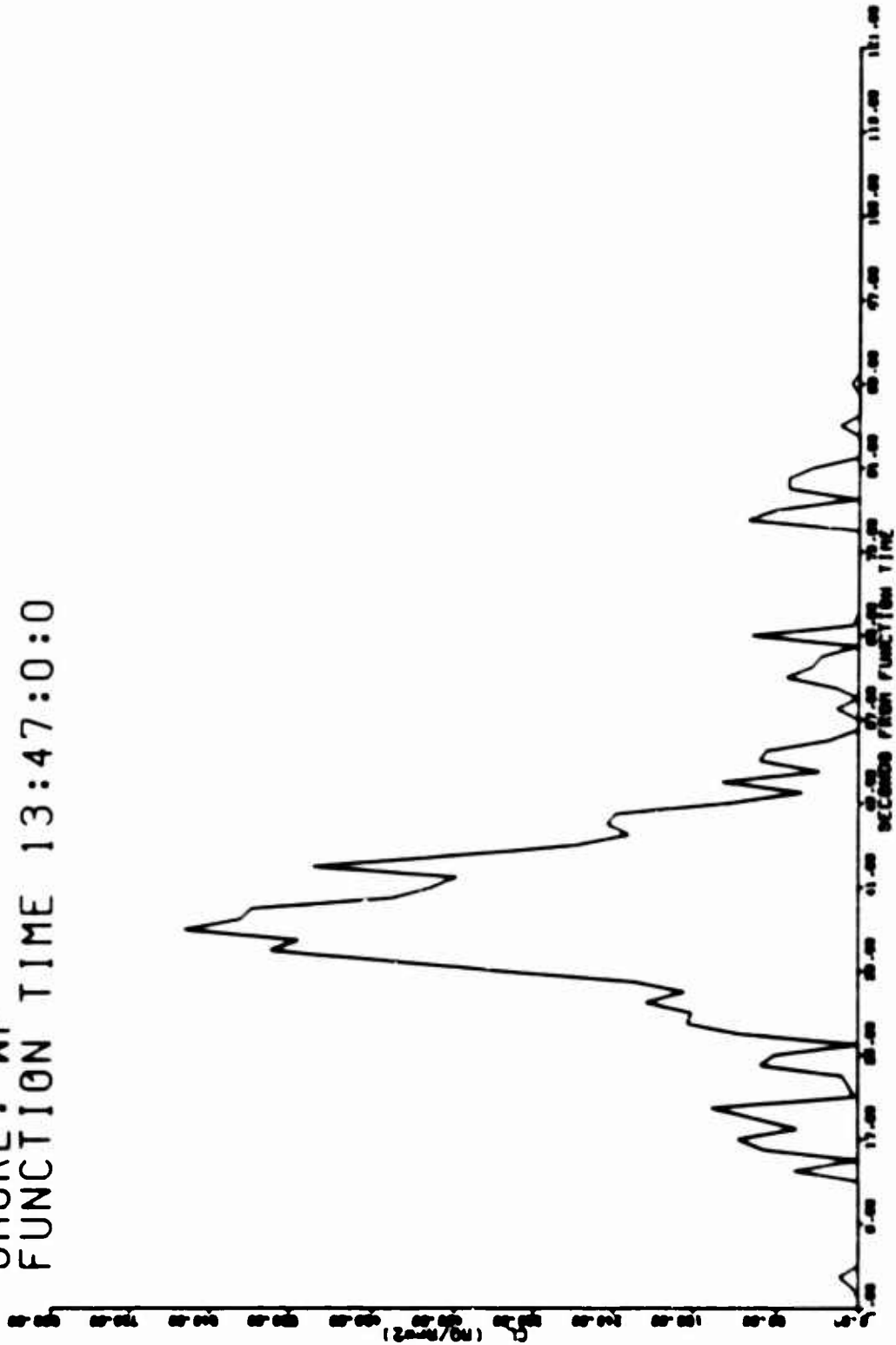
CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



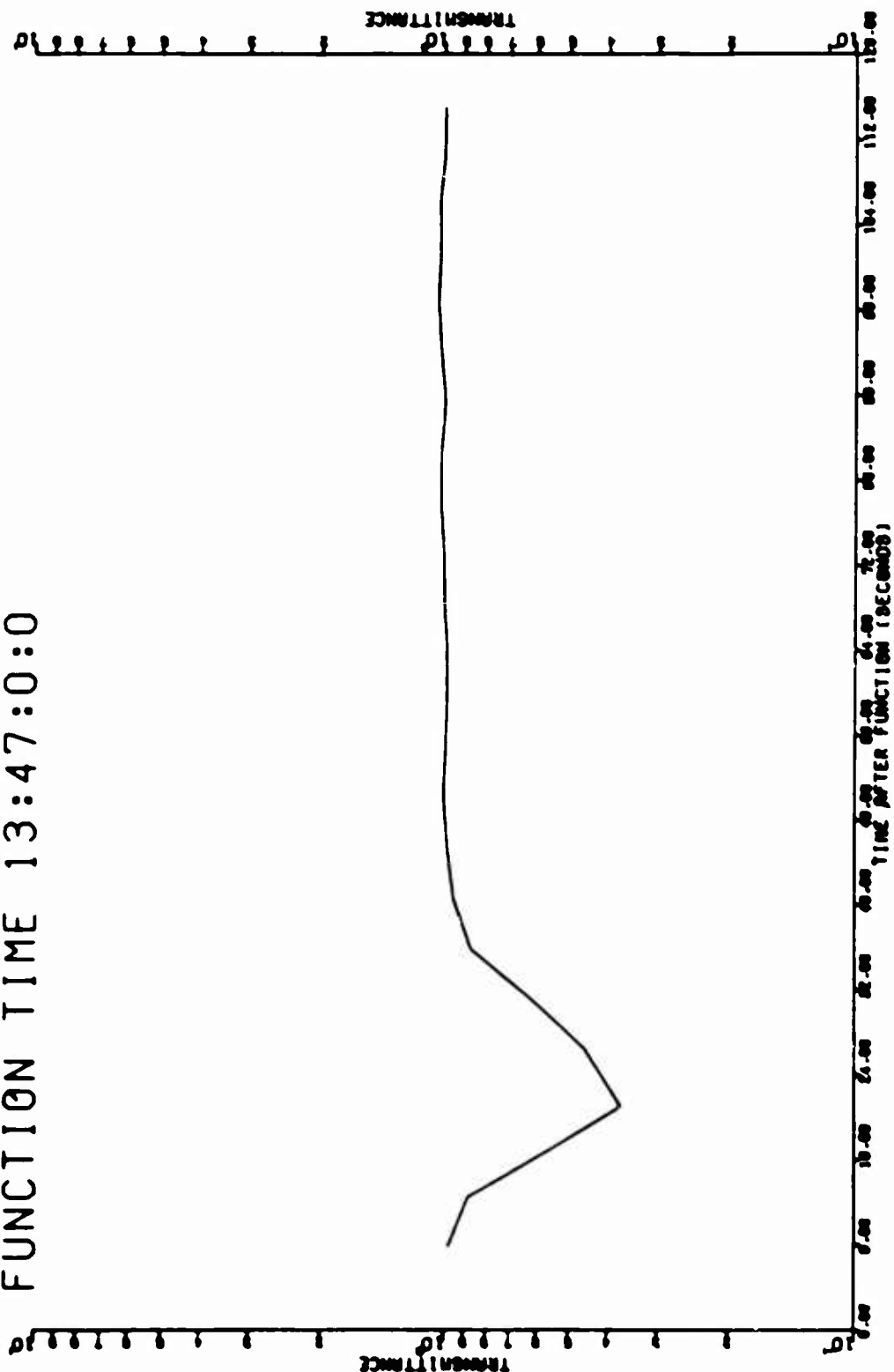
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



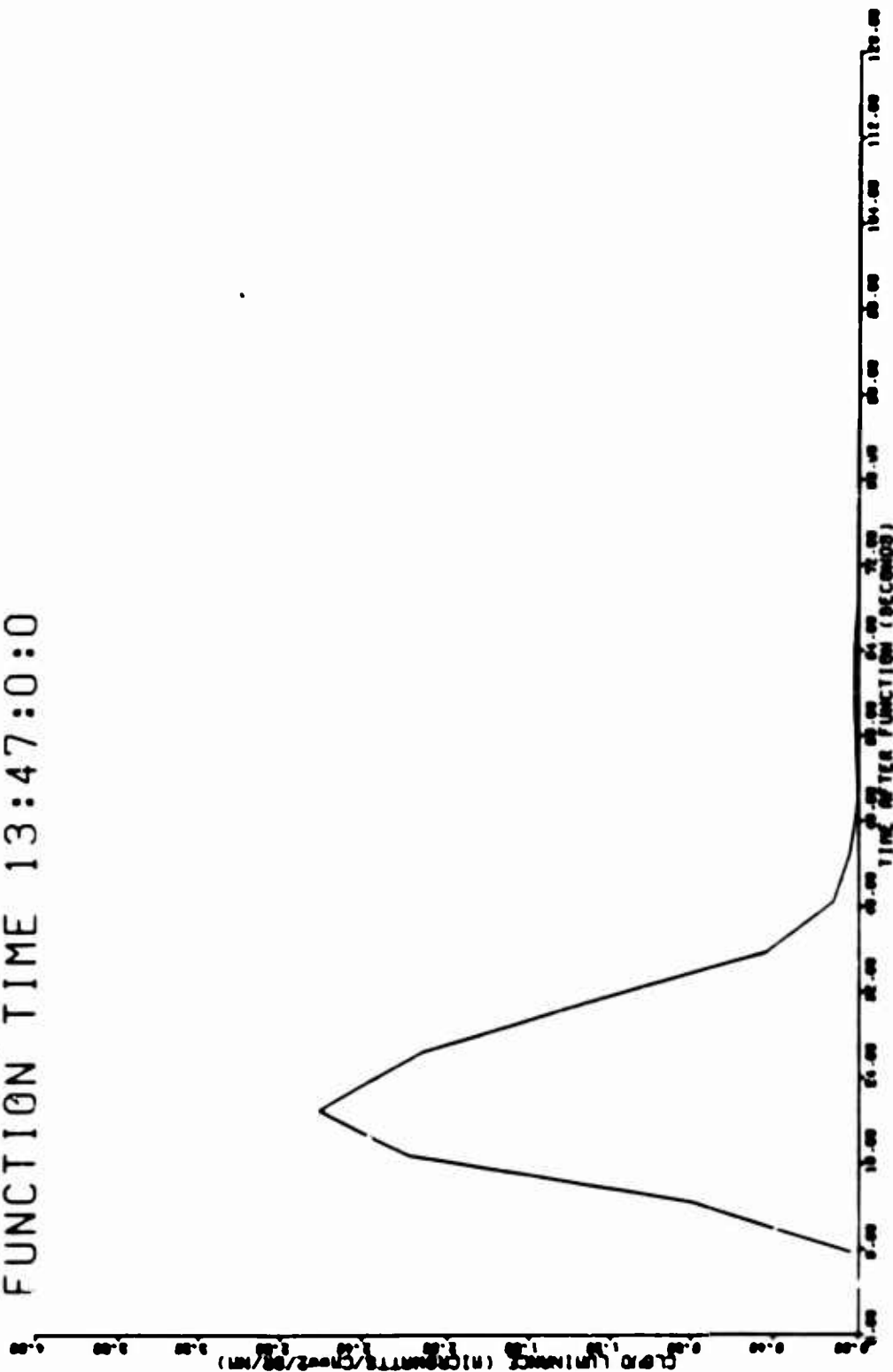
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



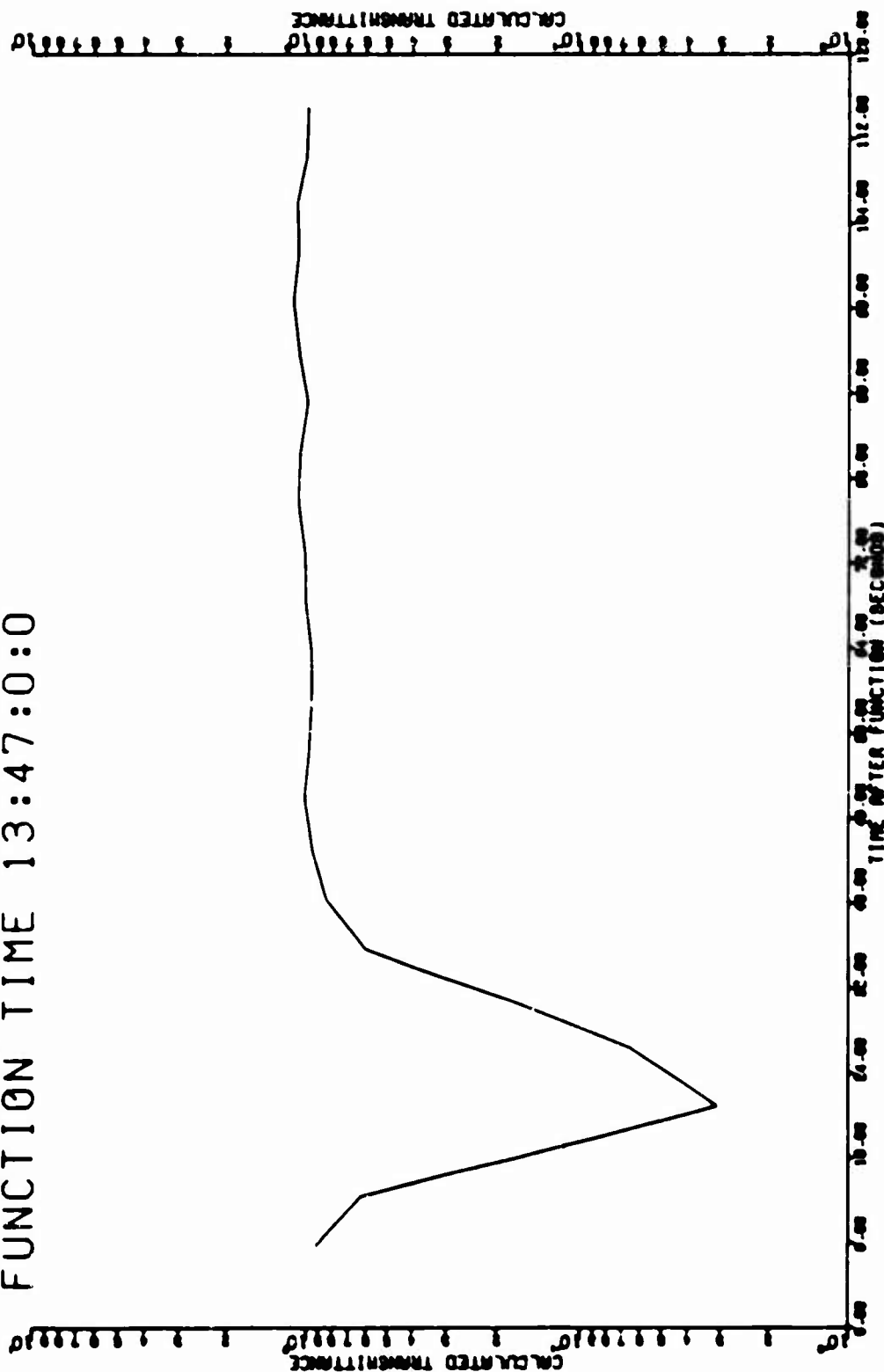
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



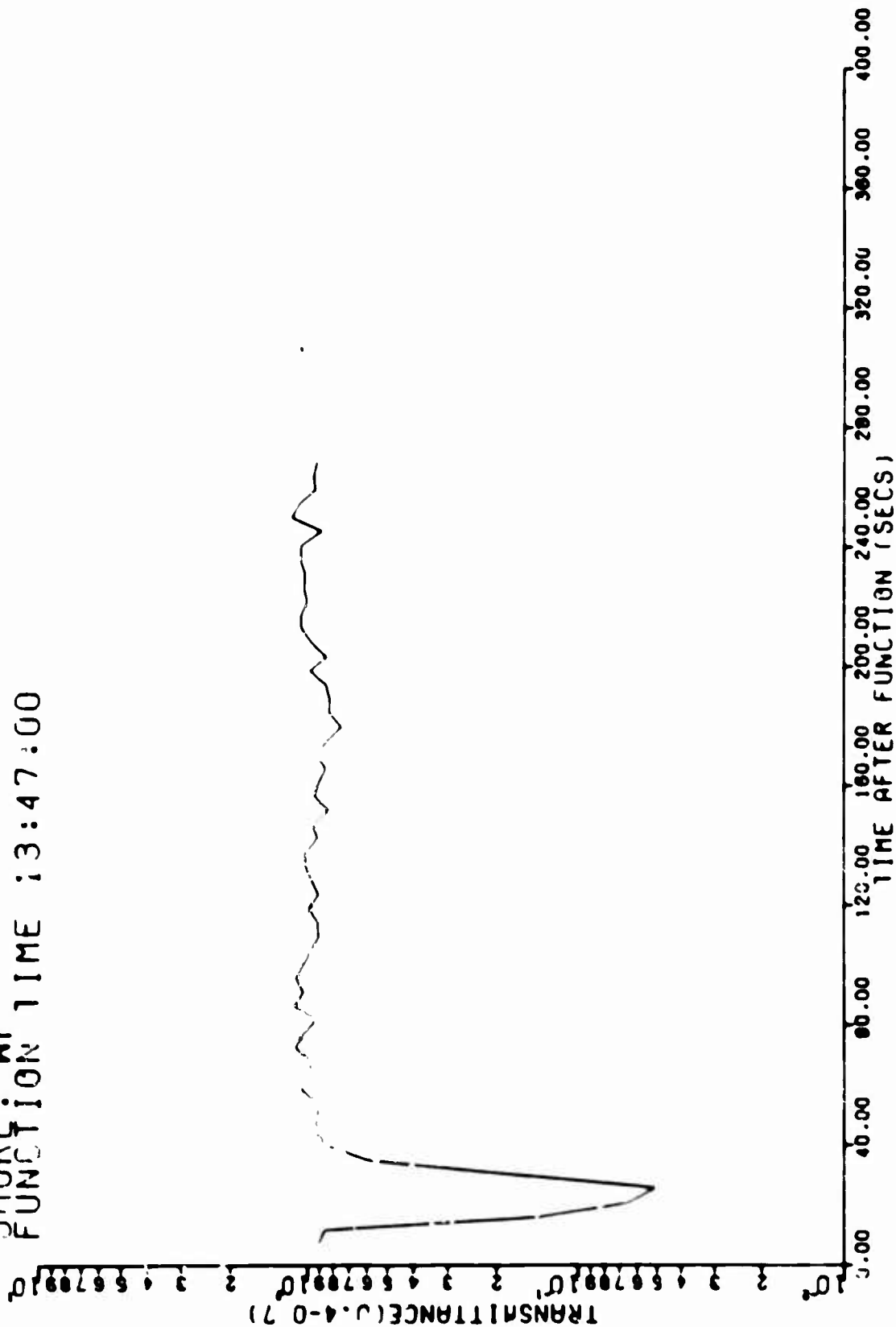
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #18 (DP1-002)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:0:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 18 (DP-10u2)
 DATE: 23 SEP 1977
 SMOKE: WP
 FUNCTION TIME 13:47:00



TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

APPENDIX B-I-13

TRIAL DP1-002-T-19 (WP SMOKE) 7 OCT 1977

SUMMARY OF TEST DATA	B-I-13-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-13-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-13-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-13-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-13-12
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-13-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-13-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-13-15
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-13-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-13-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-13-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-13-19
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-13-20
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-13-21
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-13-22

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-13-23
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-13-24
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-13-25
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-13-26

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #19

Date: 7 Oct 77

Time: 1336:32 MDT

Wind Direction (Transport) (degrees) (4m)	345
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.5
Temperature at 2-meters, Trial Time (T, °C)	13.9
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	17.3
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	5.8
Temperature Gradient, 0.5-8m (ΔT , °C)	ND
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.05
Pasquill Stability Category	B
Relative Humidity (percent) (2m)	35.0
Solar Azimuth (deg)	185.5
Solar Altitude (deg)	44.1
Air Density - ρ (kg m ⁻³)	1.058
Solar Radiation (Langley's per minute)	1.144
Barometric Pressure (millibars)	873.7
Visibility (km)	113
Reflectivity, OD Target	0.2
Haze (footlamberts)	71
Brightness, Background (footlamberts)	1580
Brightness, White Target (footlamberts)	1371
Brightness, OD Target	350
Percent Opaque Cloud Cover	3

Munitions/Submunitions Used (WP, 81mm) 6

Number of Munitions/Submunitions Functioned 6

Particle Size Range (micron)

(0.3 - 0.4) . . . . .	.50
(0.4 - 0.6) . . . . .	.34
(0.6 - 0.8) . . . . .	.10
(0.8 - 1.0) . . . . .	.04
(1.0 - 1.5) . . . . .	.02
(1.5 - 3.0) . . . . .	.00
Log ₁₀ NMD	-.40086
σLog ₁₀ NMD . . . . .	.18904
NMD . . . . .	.40
MMD . . . . .	.48

Initial Cloud Dimensions (Meters)

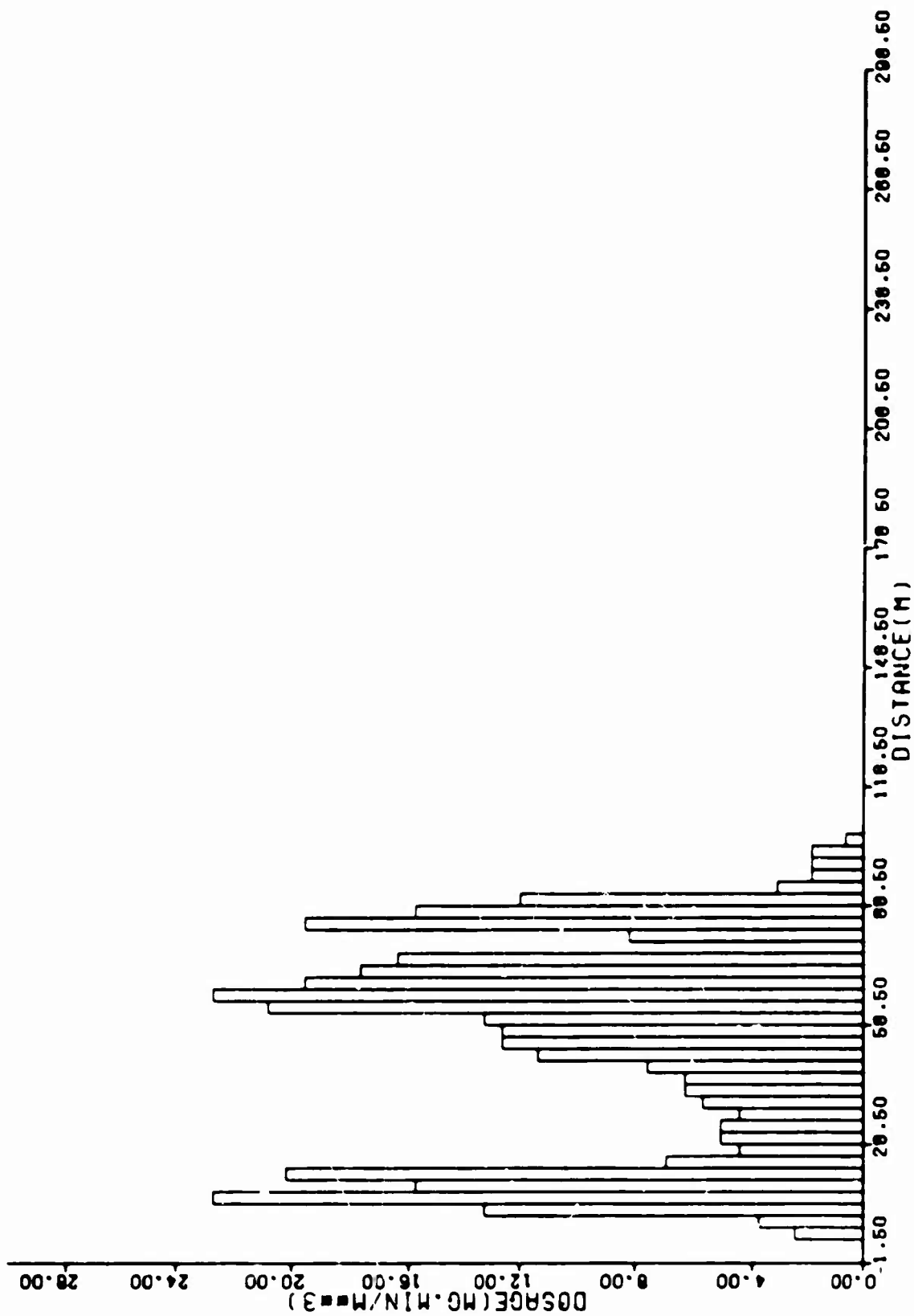
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1336:32	26	25	4
1336:42	26	37	19
1336:52	40	50	34
1337:02	84	51	60
1371:12	88	66	60
1337:22	91	79	61

SKY BRIGHTNESS

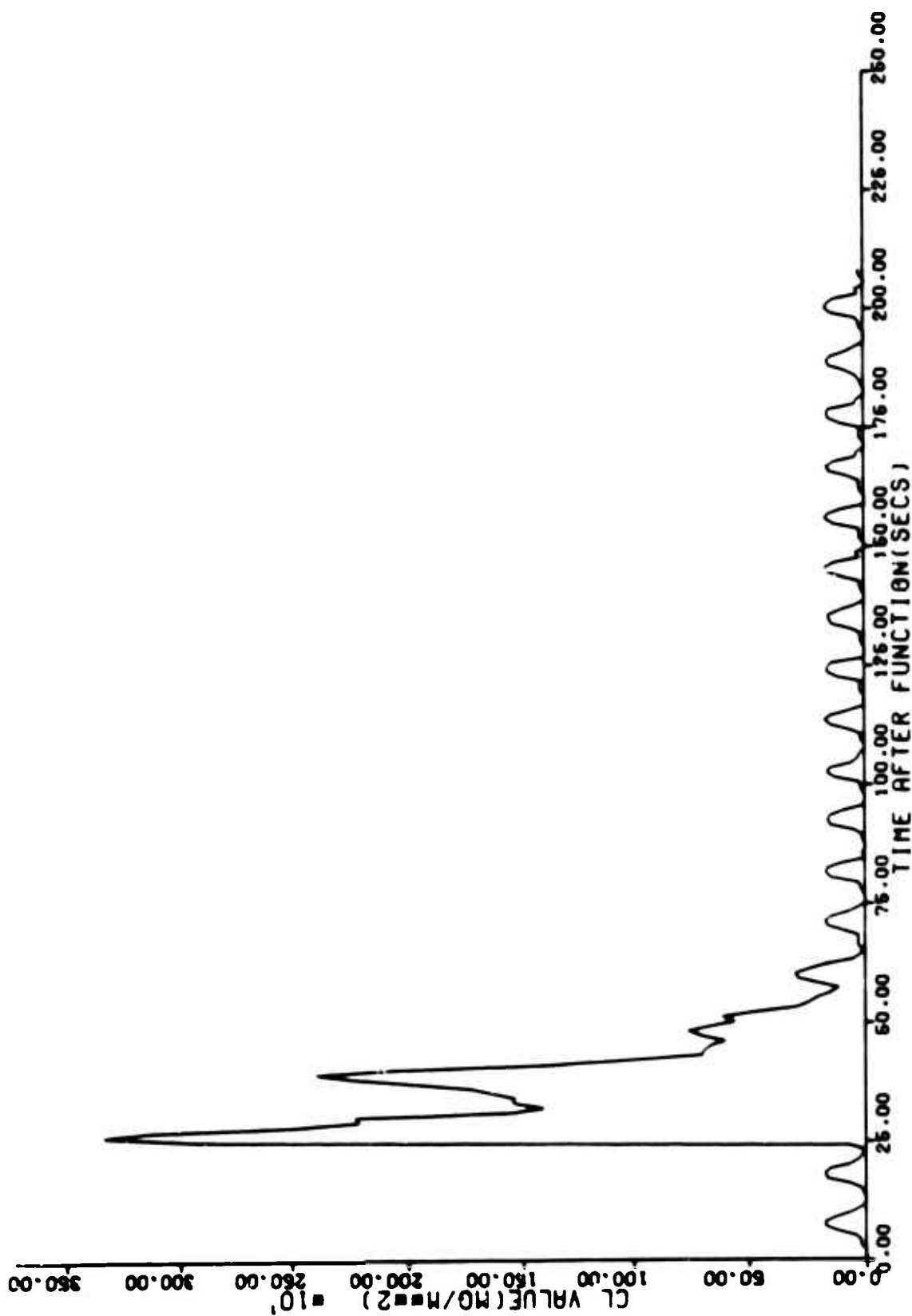
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	504
5	1084
10	1300
15	1300
20	1300
25	1640
30	1640
35	1640
40	1300
45	1300

Viewing azimuth 240° except 255° at 0 degrees elevation

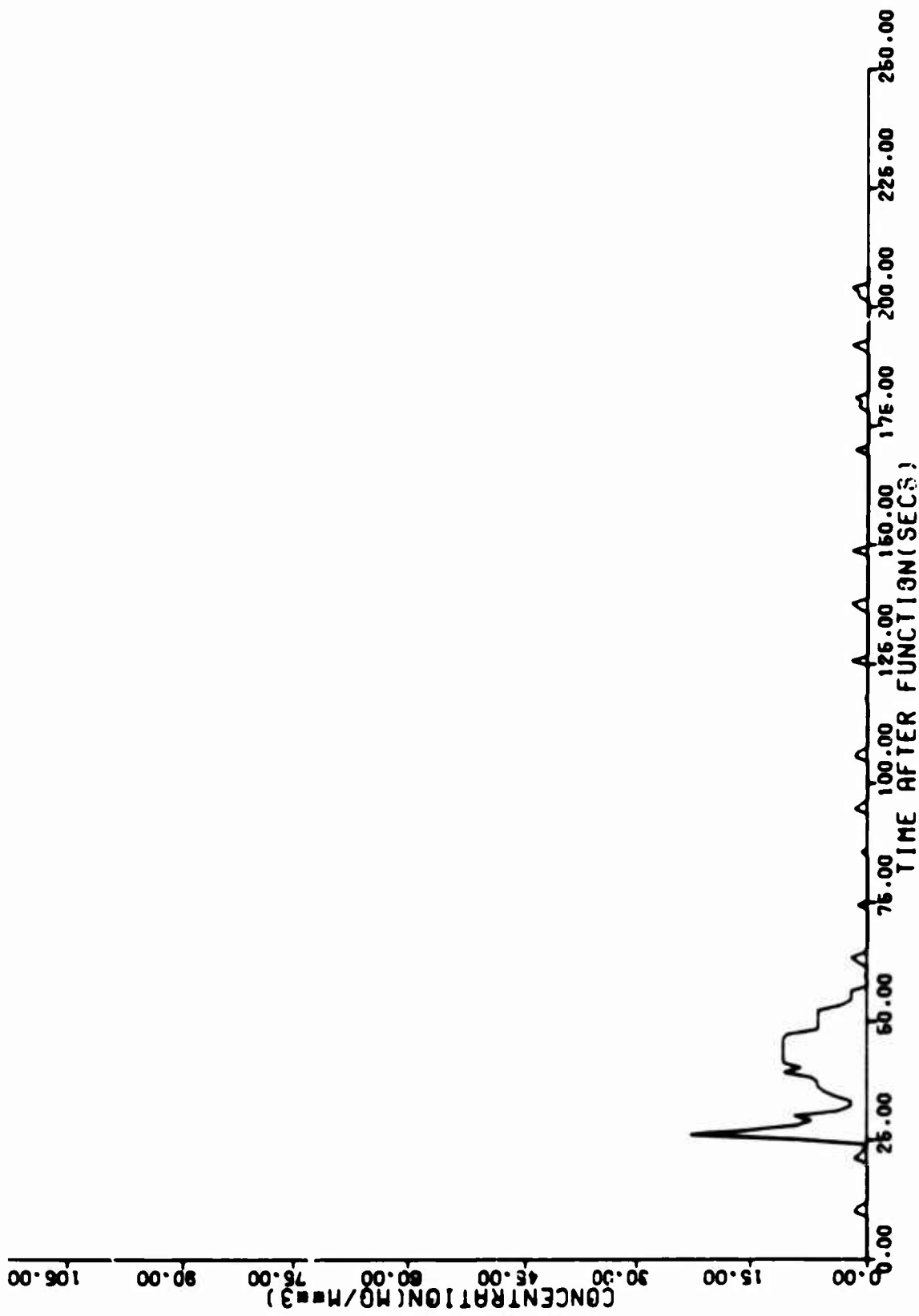


13 (DP-1002), 7 OCT 1977, 13:36:32, WP SMOK.



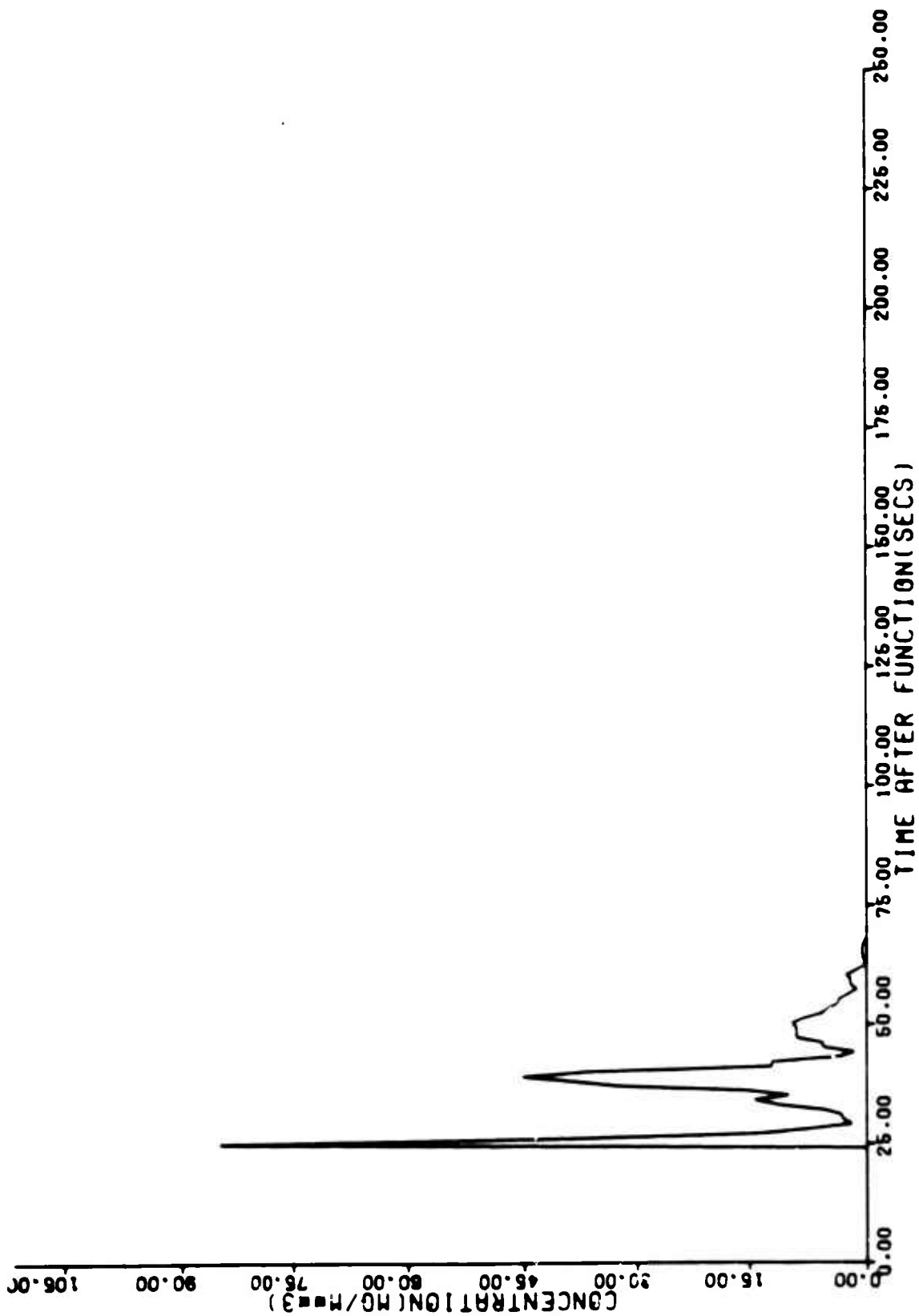
TRIAL 19 (DP-1002), 7 OCT 1977, 13:36:32, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



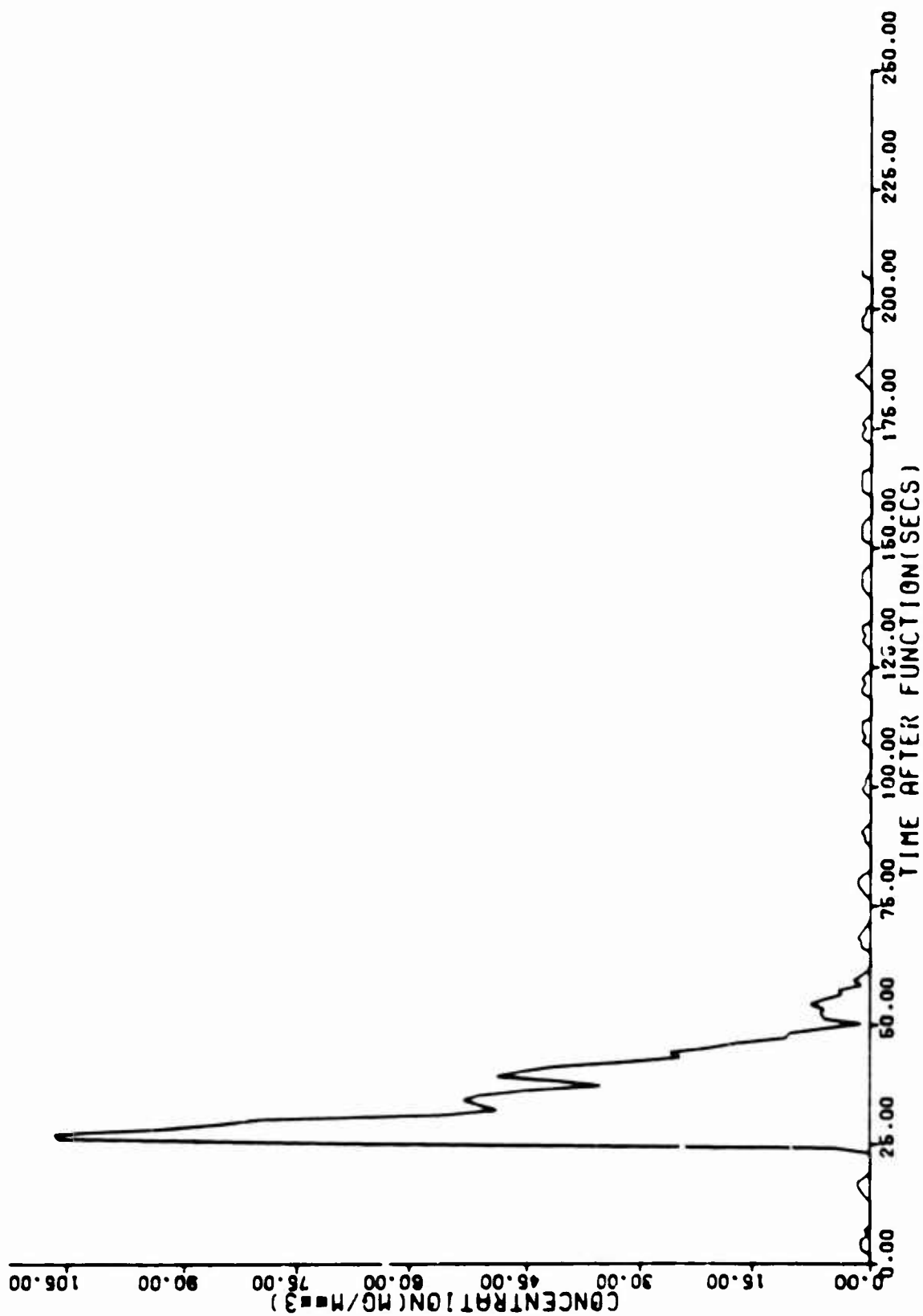
TRIAL 19 (DP-1002), 7 OCT 1977, 13:36:32, WP SMOKE

AEROSOL PHOTOMETER #2, X=0.00, Y=30.00, Z=0.00



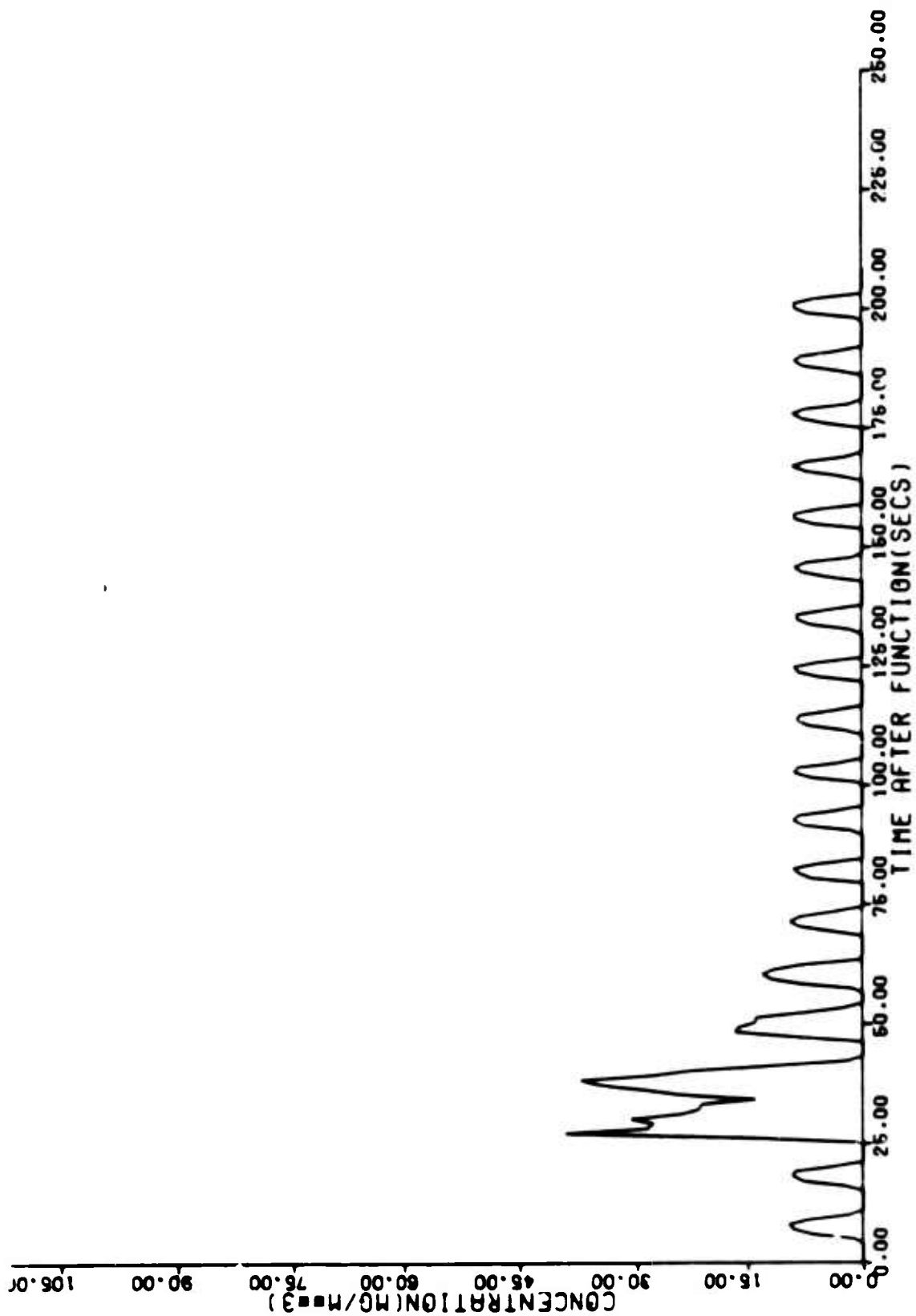
TRIAL 19 (DP-1002), 7 OCT 1977, 13:36:32, WP SMOKE

AEROSOL PHOTOMETER #3, X=0.00, Y=48.00, Z=0.00



TRIAL 19 (DP-1002), 7 OCT 1977, 13:36:32, WP SMOKE

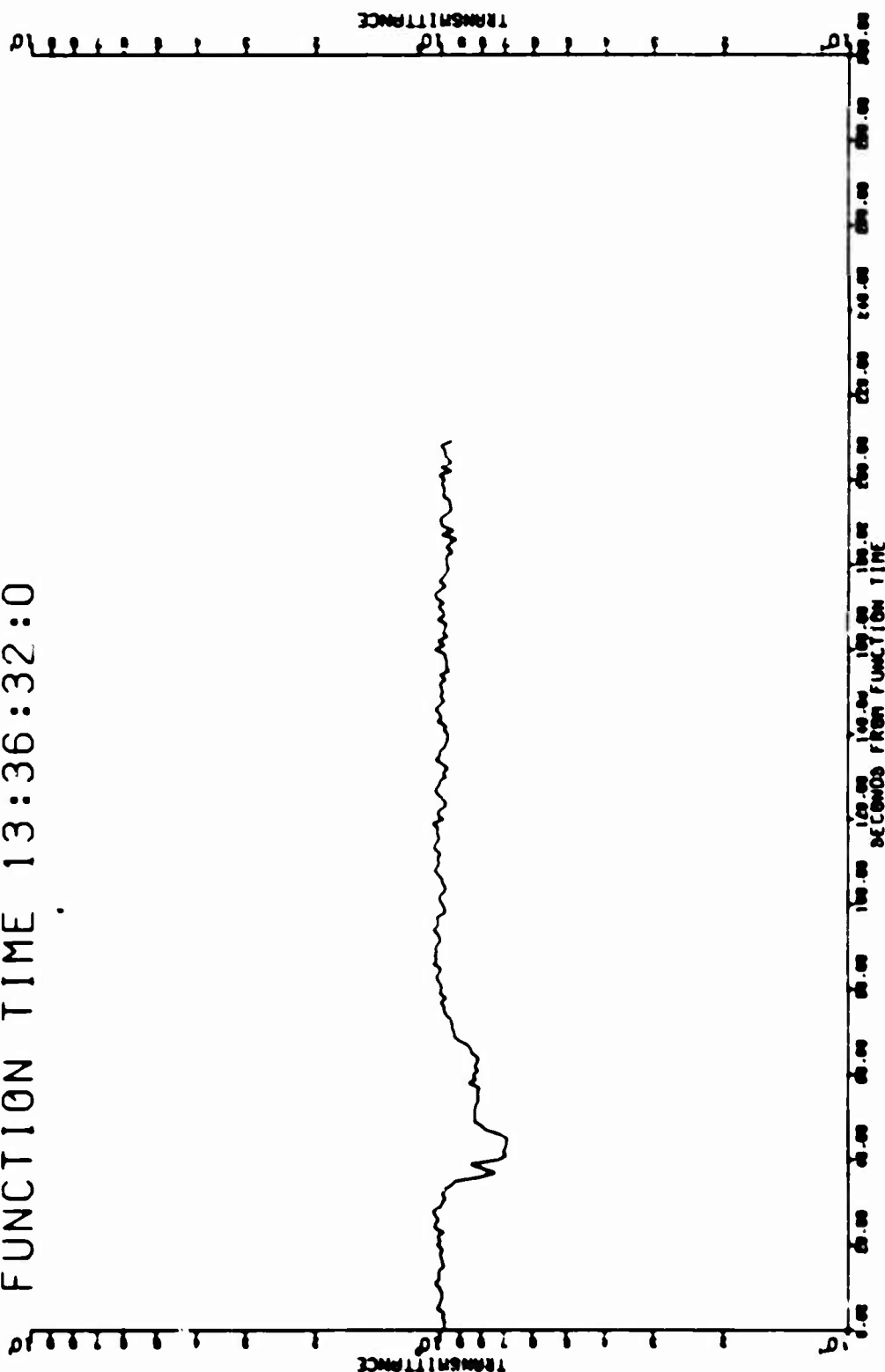
AEROSOL PHOTOMETER #4, X=0.00, Y=66.00, Z=0.00



TRIAL 19 (DP-1002). 7 OCT 1977. 13:36:32. WP SMOKE

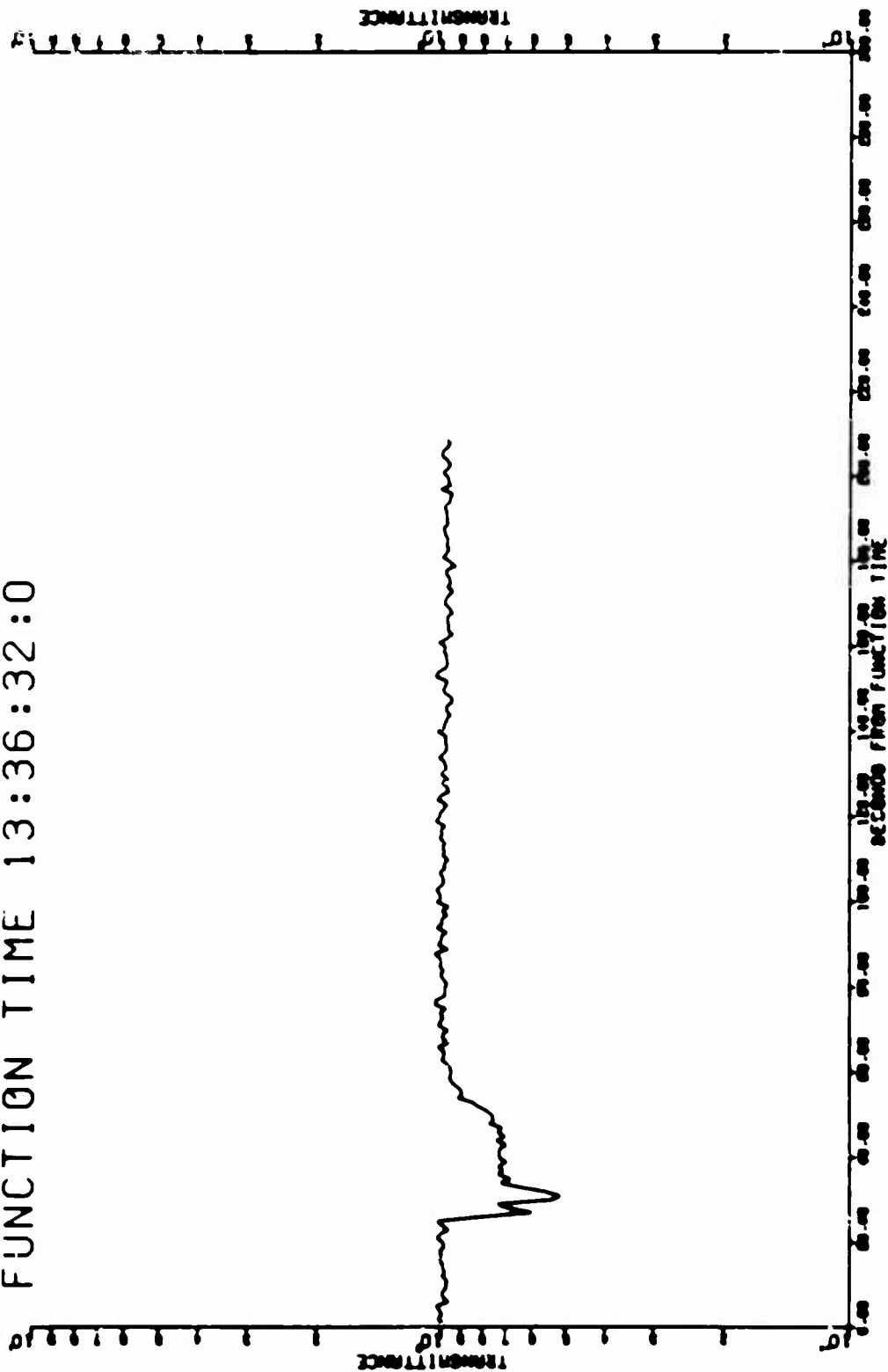
AEROSOL PHOTOMETER #5. X=0.00. Y=84.00. Z=0.00

TRIAL #19 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



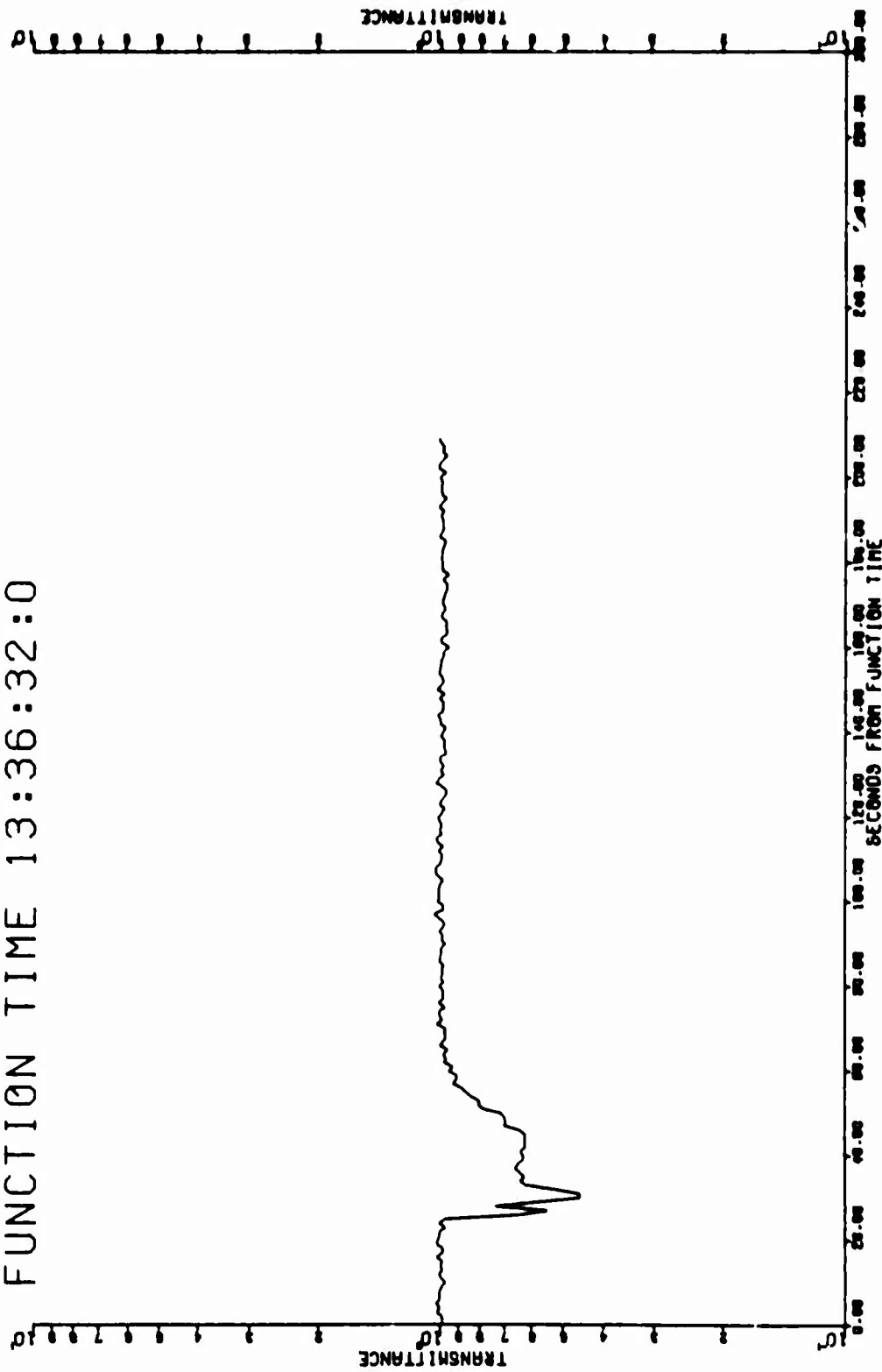
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.445 LOCATED ON ROW M

TRIAL #19 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

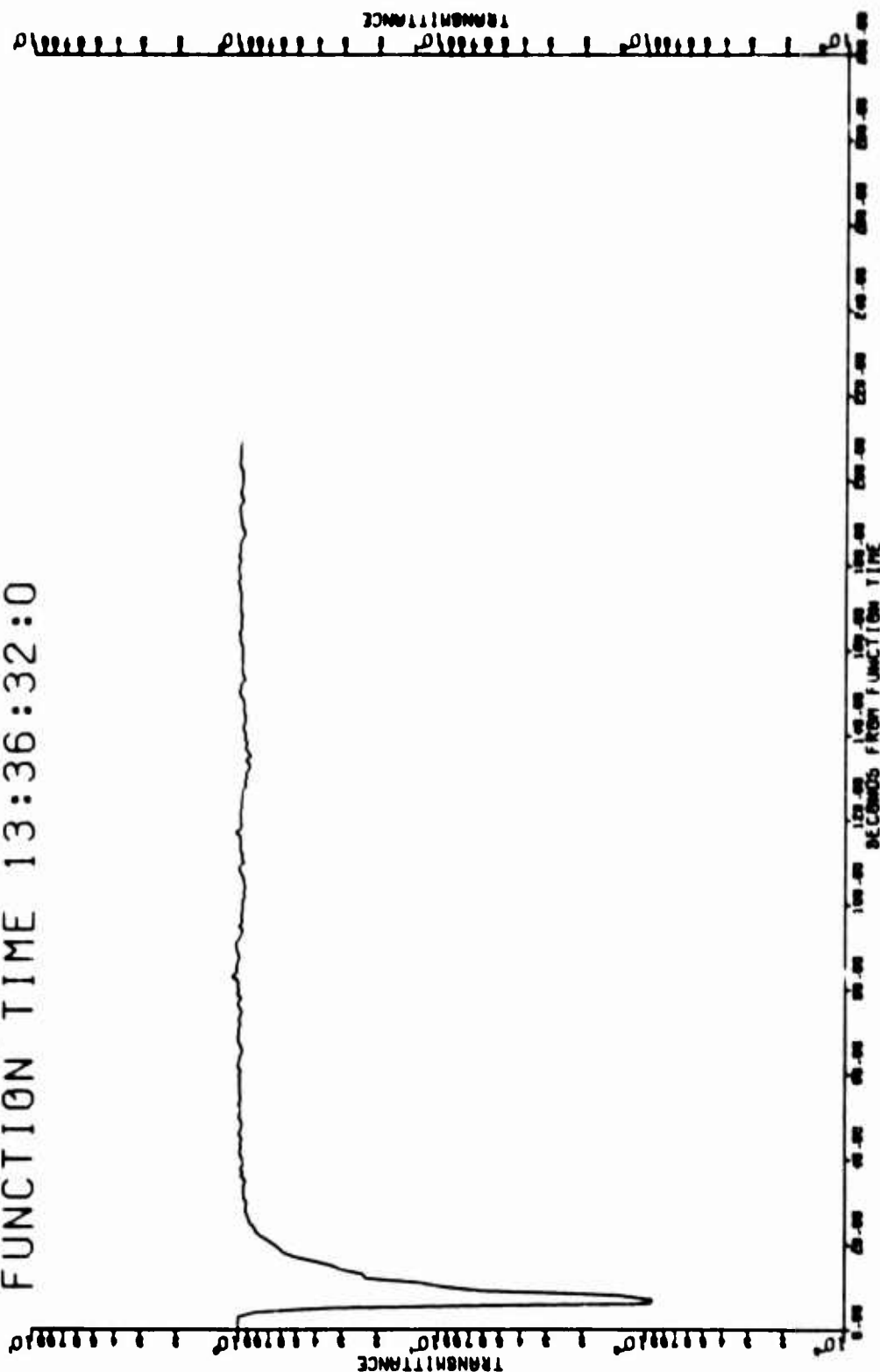
TRIAL #19 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

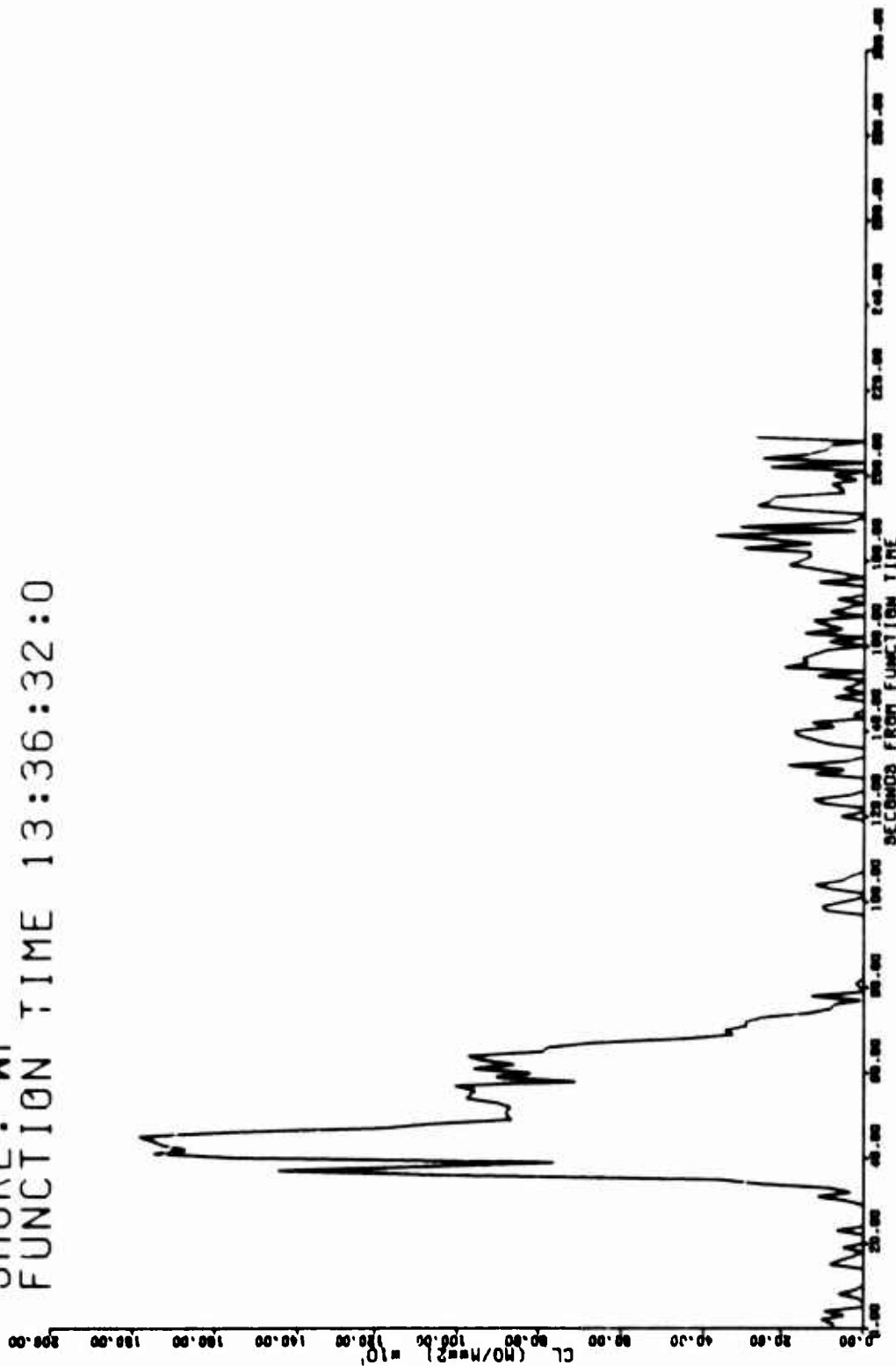
B-1-13-14

TRIAL #19 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



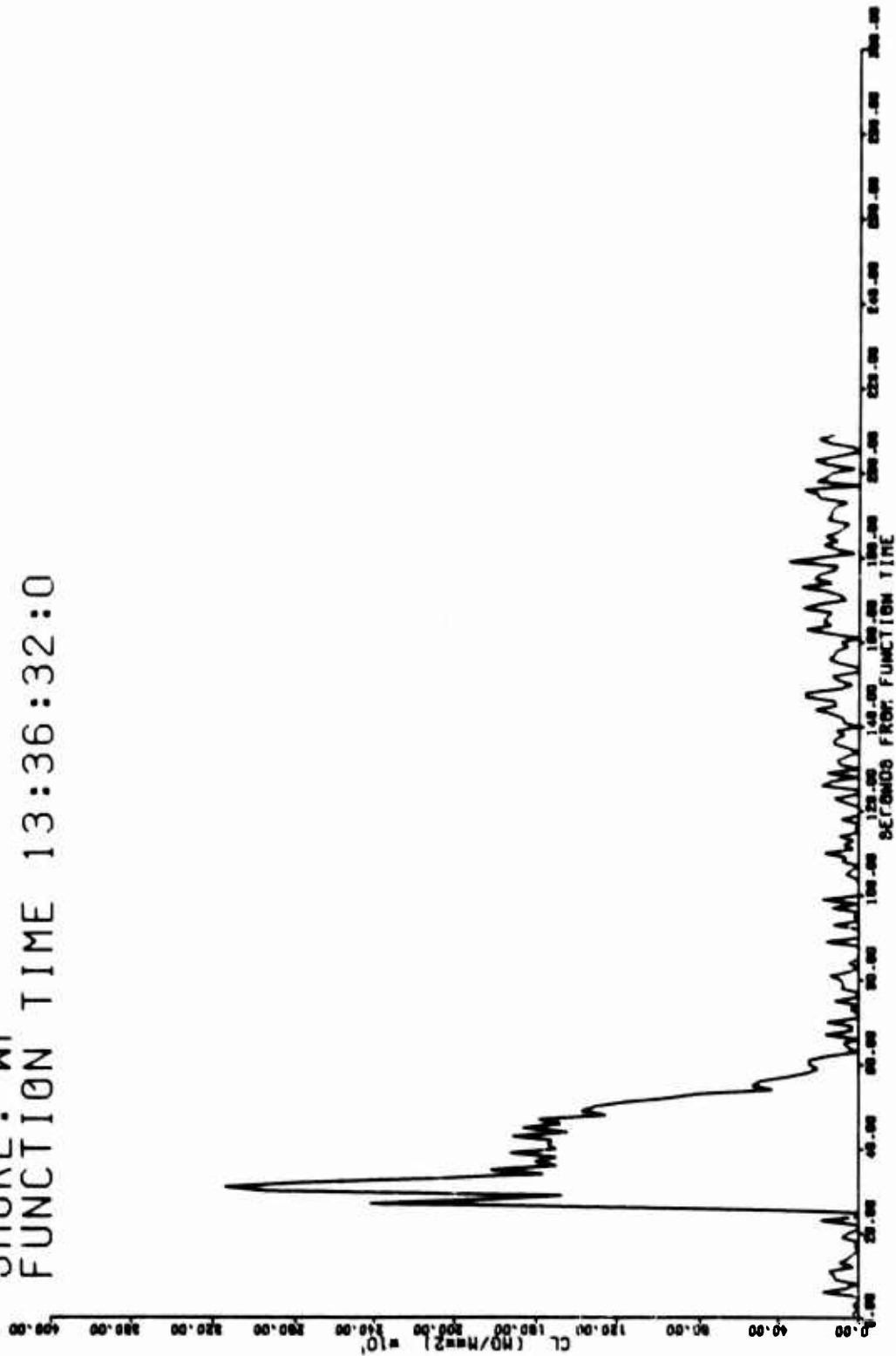
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0



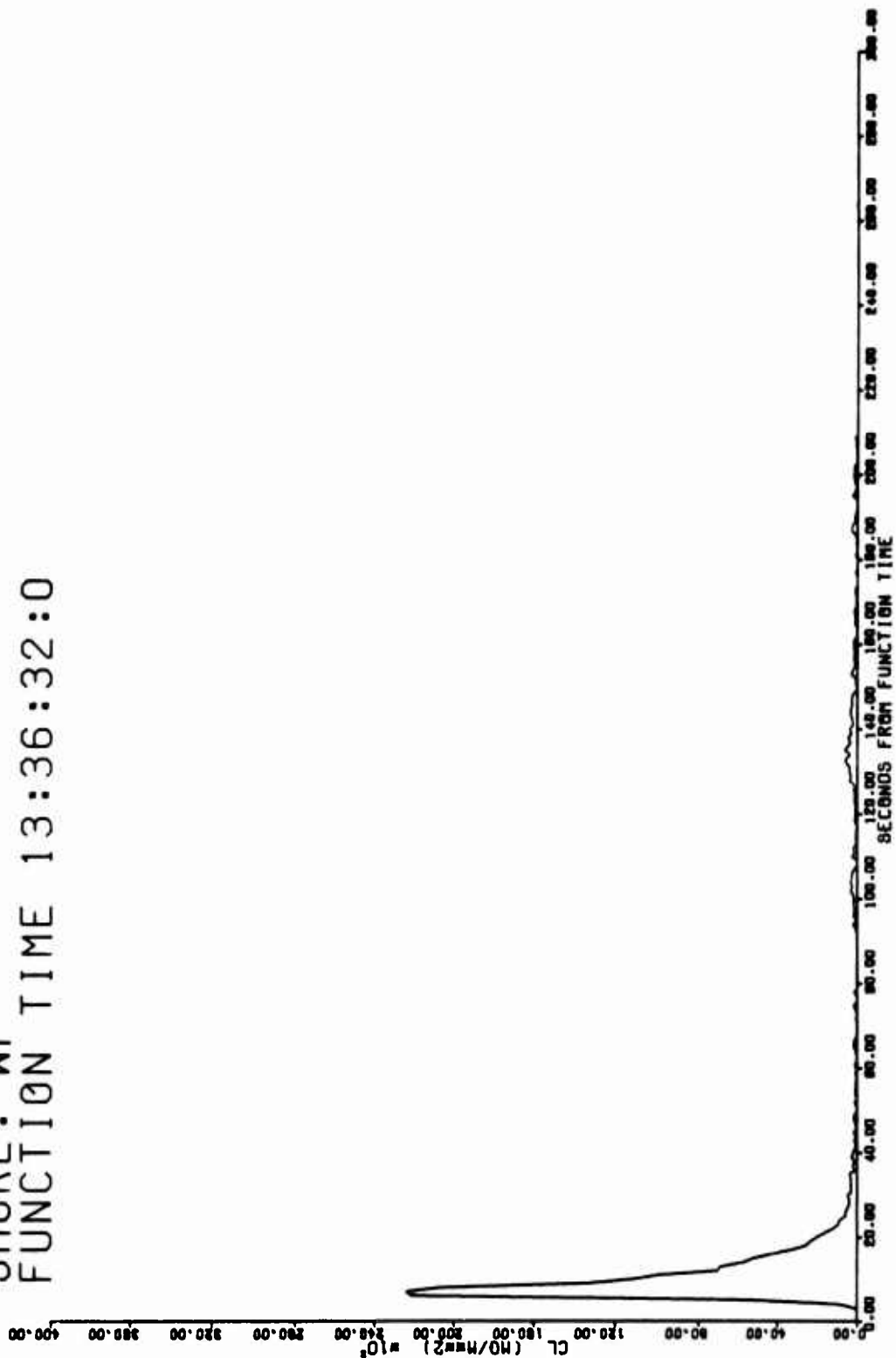
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0



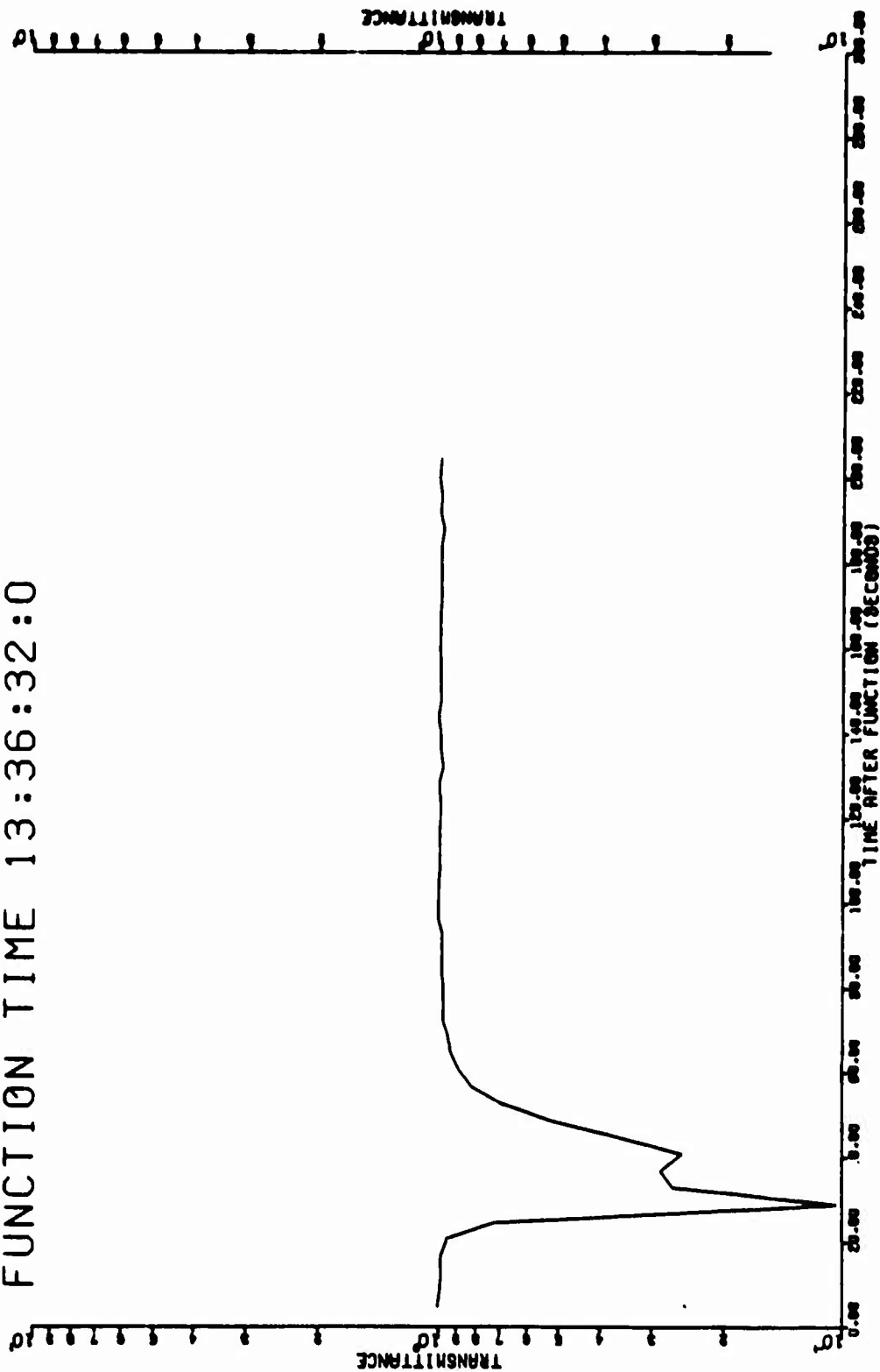
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0



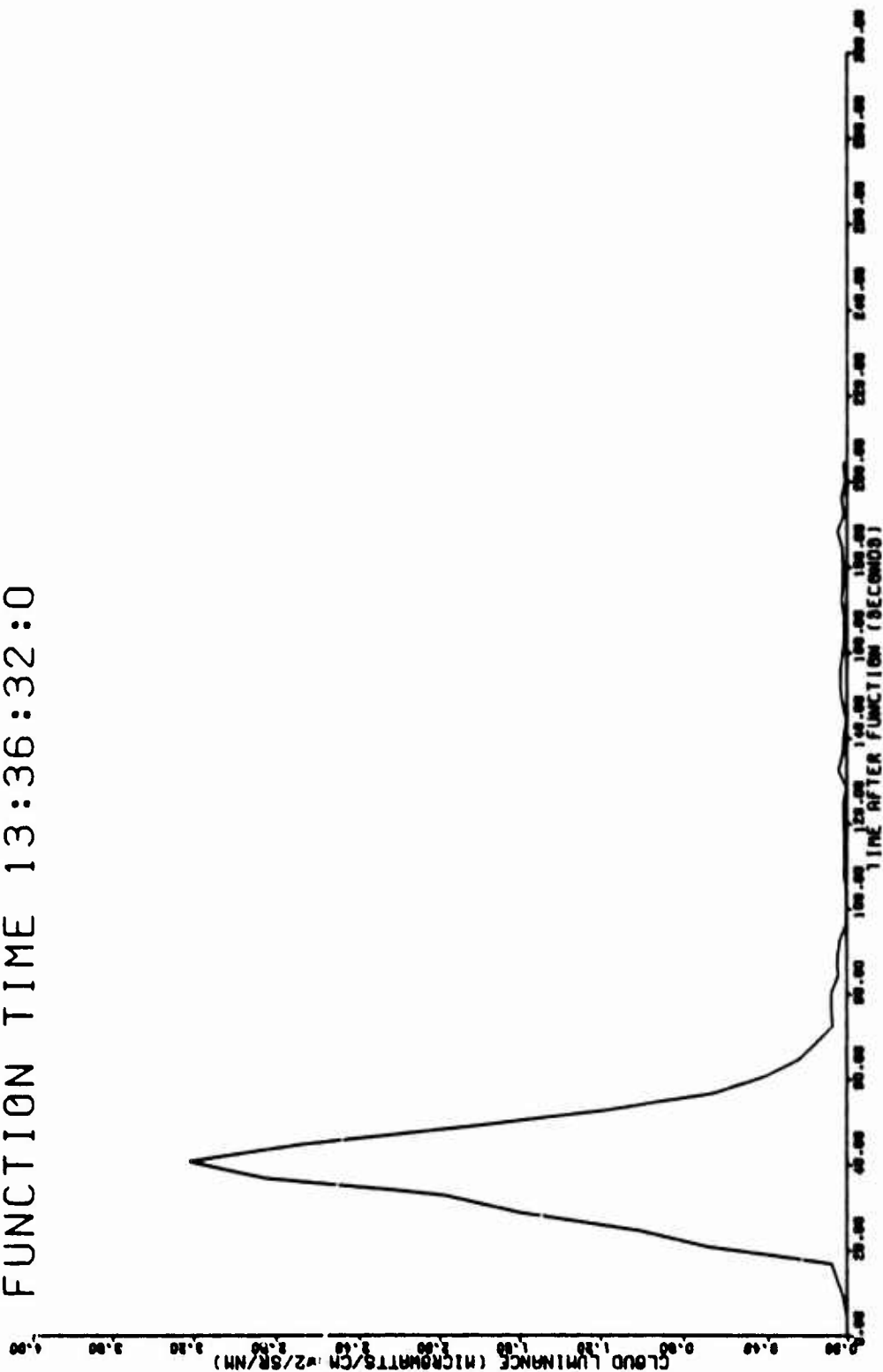
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #19 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



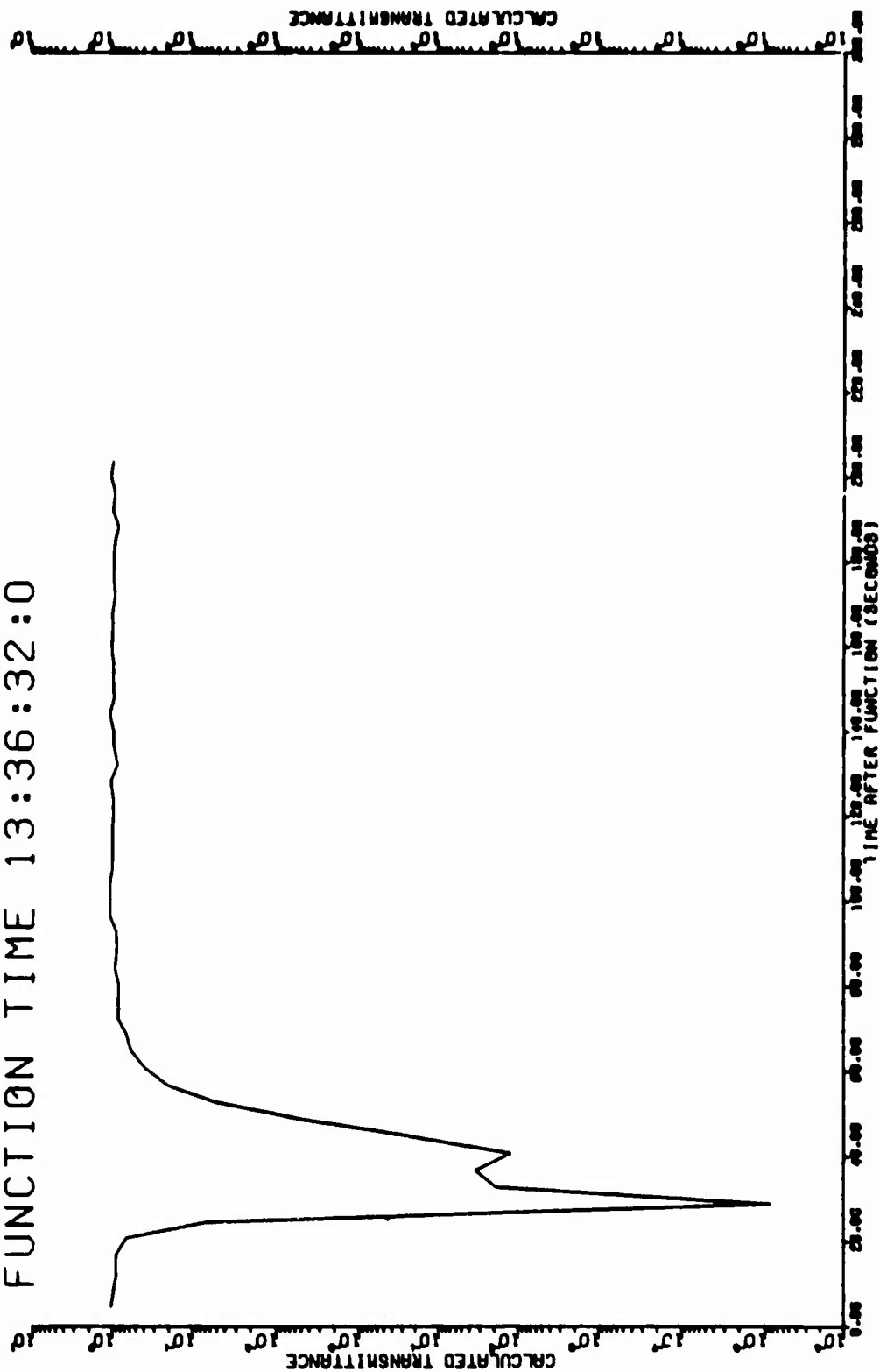
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0



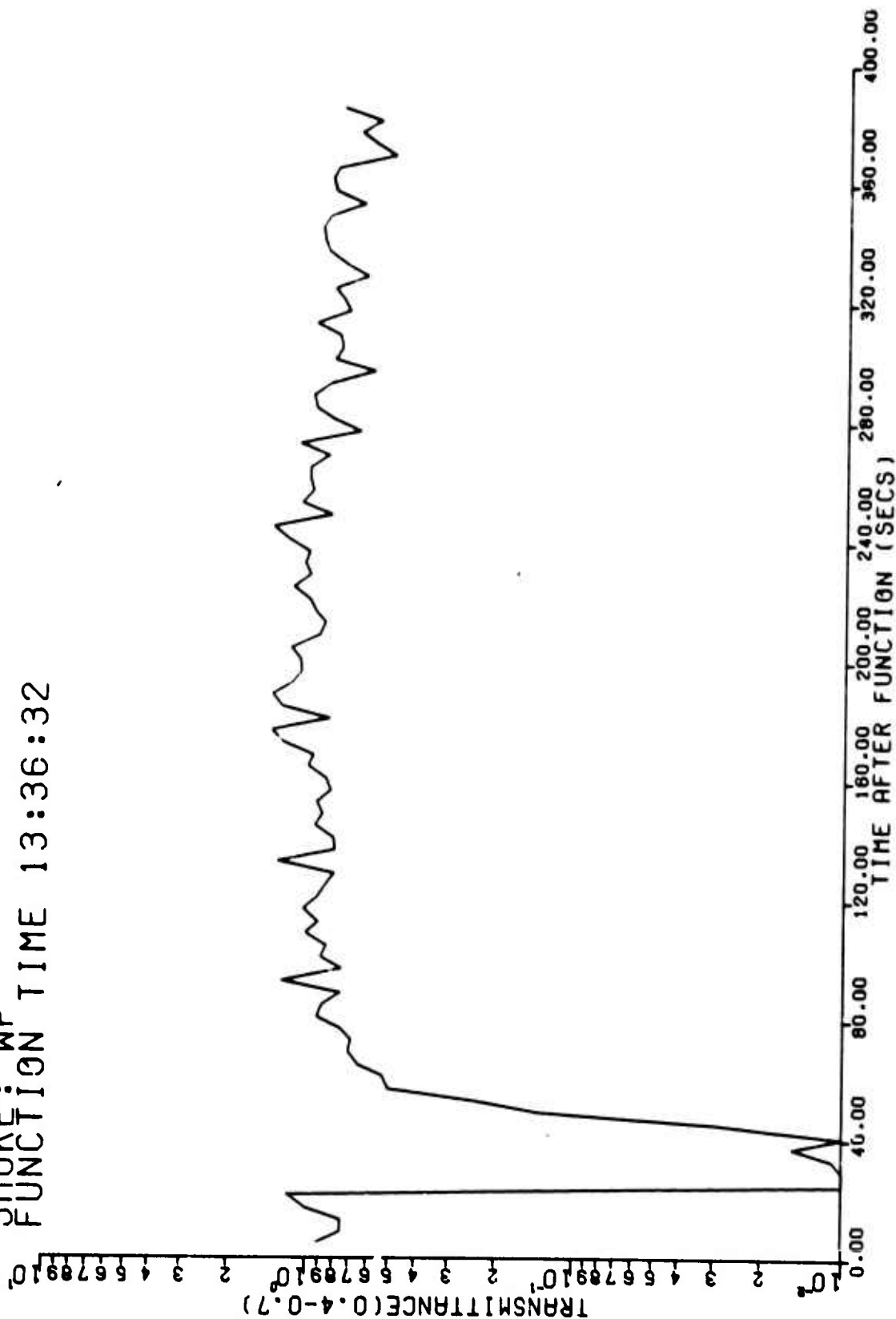
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0



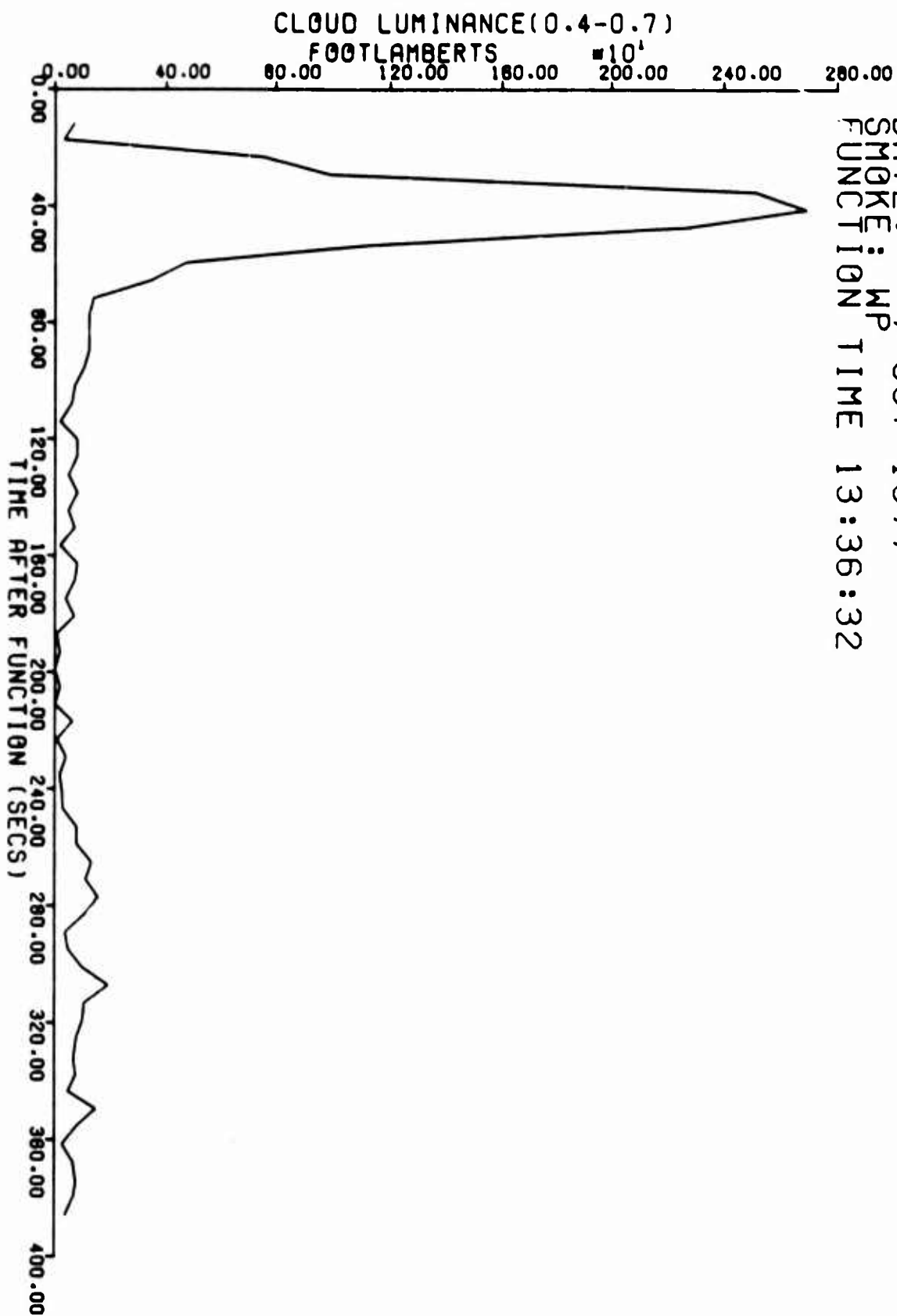
CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 19, (DP-1002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32



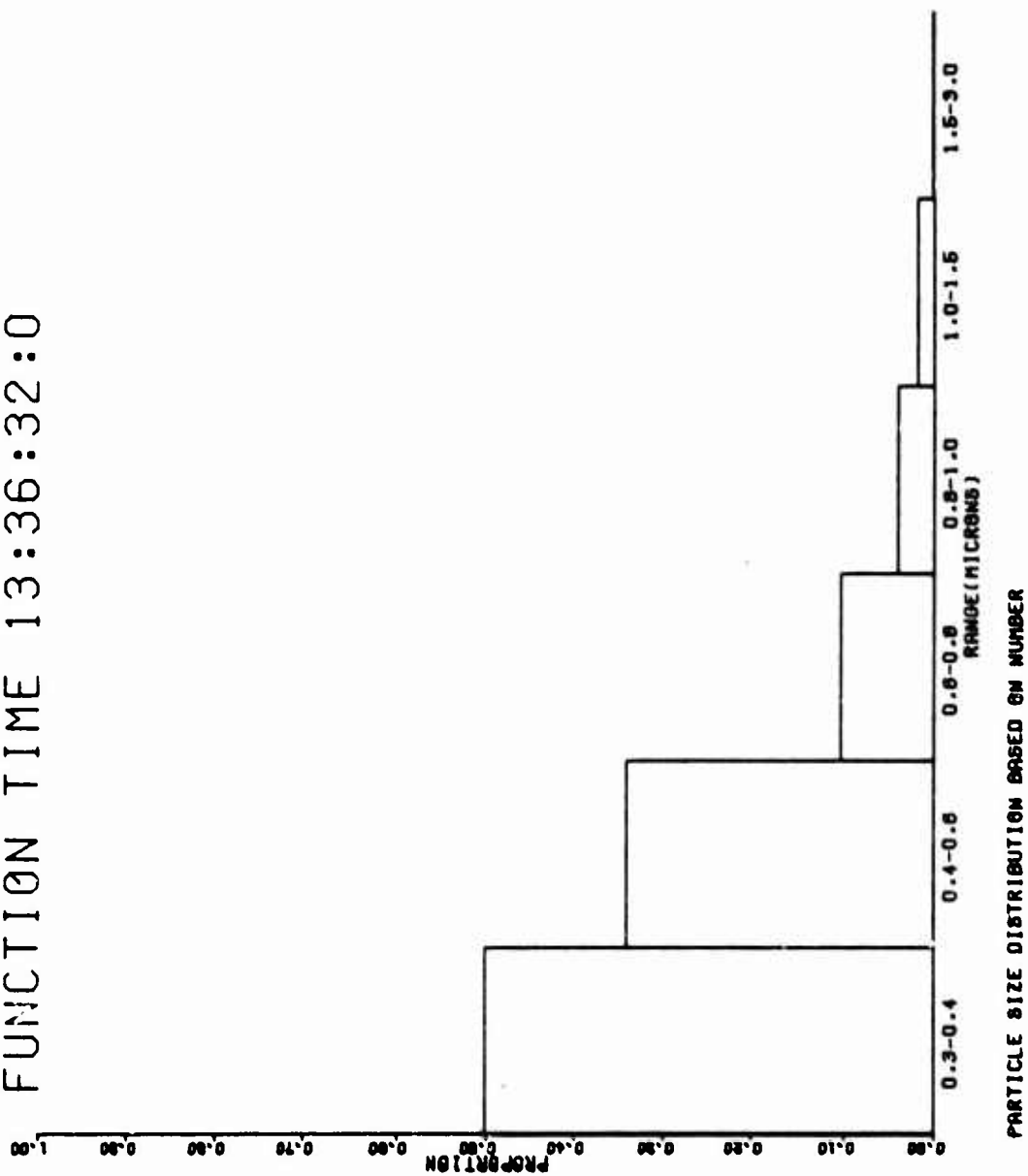
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 19, (DP-1002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32



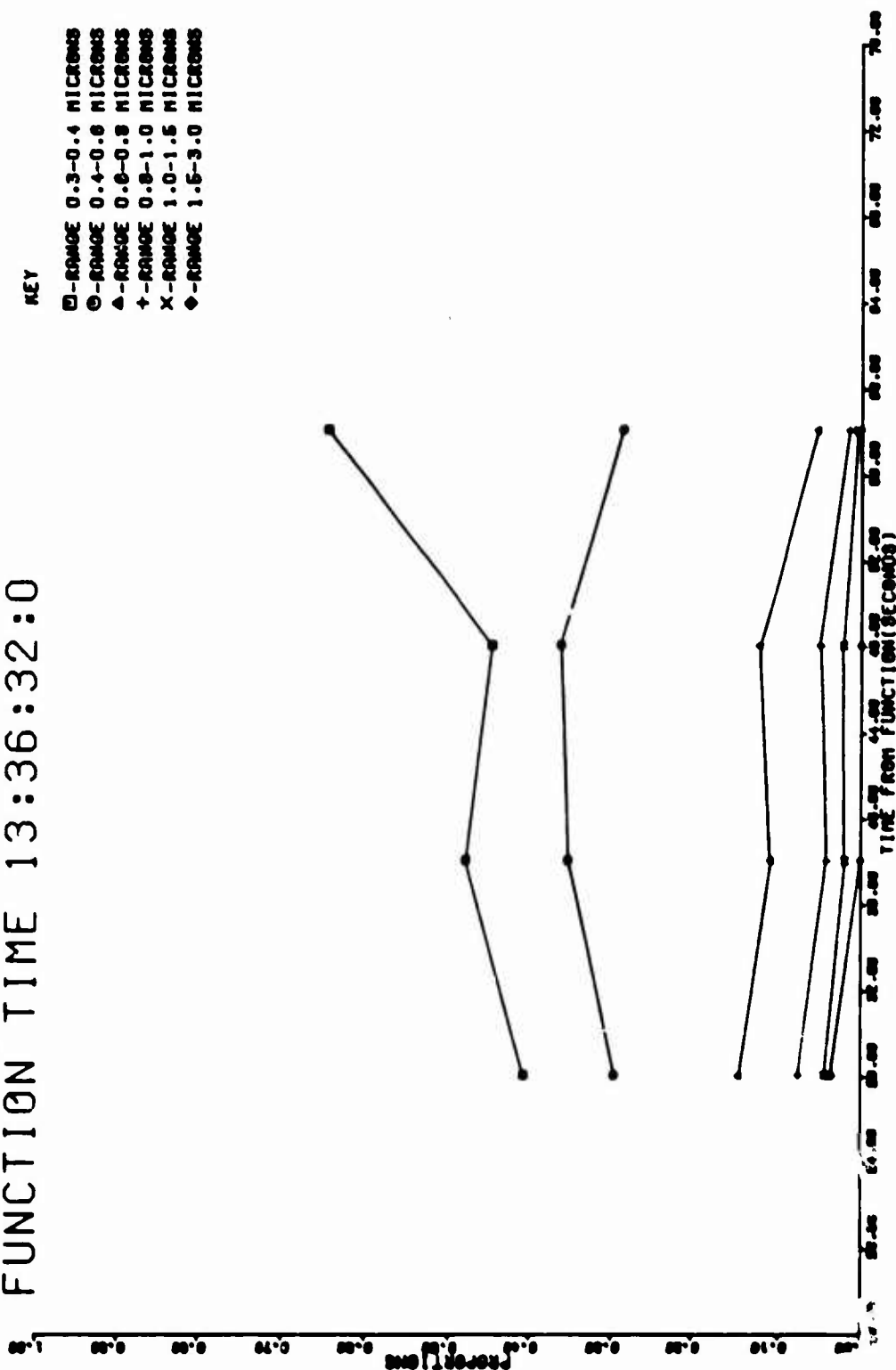
CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #19 'DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 13:36:32:0



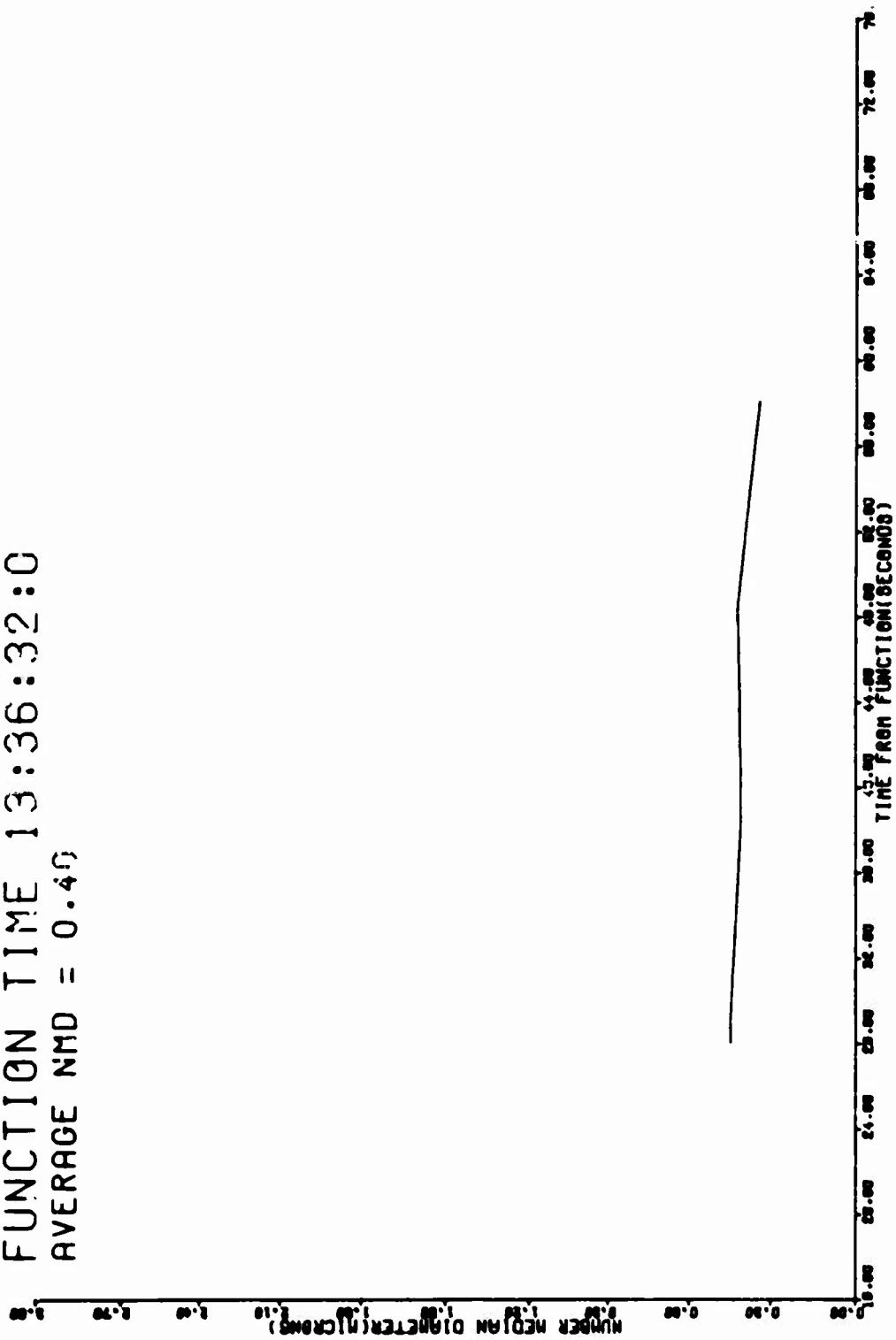
TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0

KEY
 □ - RANGE 0.3-0.4 MICRONS
 ○ - RANGE 0.4-0.6 MICRONS
 ▲ - RANGE 0.6-0.8 MICRONS
 + - RANGE 0.8-1.0 MICRONS
 X - RANGE 1.0-1.5 MICRONS
 ◆ - RANGE 1.5-3.0 MICRONS



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #19 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:36:32:0
 AVERAGE NMD = 0.40



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-14

TRIAL DP1-002-T-21 (WP SMOKE) 5 OCT 1977

SUMMARY OF TEST DATA	B-I-14-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-14-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-14-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-14-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-14-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-14-16
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-14-17
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-14-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-14-12
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-14-13
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-14-14
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-14-19
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-14-20
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-14-21
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-14-22

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	ND
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-1-14-23
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-1-14-24
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-1-14-25

SUMMARY OF TEST DAY DATA

Trial: 21

Date: 5 Oct 77

Time: 1341:01 MDT

Wind Direction (Transport) (degrees) (4m)	200
Mean Wind Speed (Transport) (\bar{u} , m/sec)	4.6
Temperature at 2-meters, Trial Time (T, °C)	25.7
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	12.6
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	4.2
Temperature Gradient, 0.5-8m (ΔT , °C)	-3.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.14
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	25
Solar Azimuth (deg)	187.0
Solar Altitude (deg)	44.7
Air Density - ρ (kg m ⁻³)	1.016
Solar Radiation (Langleys per minute)	1.144
Barometric Pressure (millibars)	867.2
Visibility (km)	137
Reflectivity, OD Target	0.1
Haze (footlamberts)	55
Brightness, Background (footlamberts)	1260
Brightness, White Target (footlamberts)	1633
Brightness, OD Target	210
Percent Opaque Cloud Cover	4

Munitions/Submunitions Used (WP, 155mm)	1
Number of Munitions/Submunitions Functioned	1
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.39
(0.4 - 0.6) . . . . .	.34
(0.6 - 0.8) . . . . .	.17
(0.8 - 1.0) . . . . .	.07
(1.0 - 1.5) . . . . .	.03
(1.5 - 3.0) . . . . .	.00
Log ₁₀ NMD	-.34215
σLog ₁₀ NMD . . . . .	.18587
NMD . . . . .	.45
MMD . . . . .	.55

Initial Cloud Dimensions (Meters)

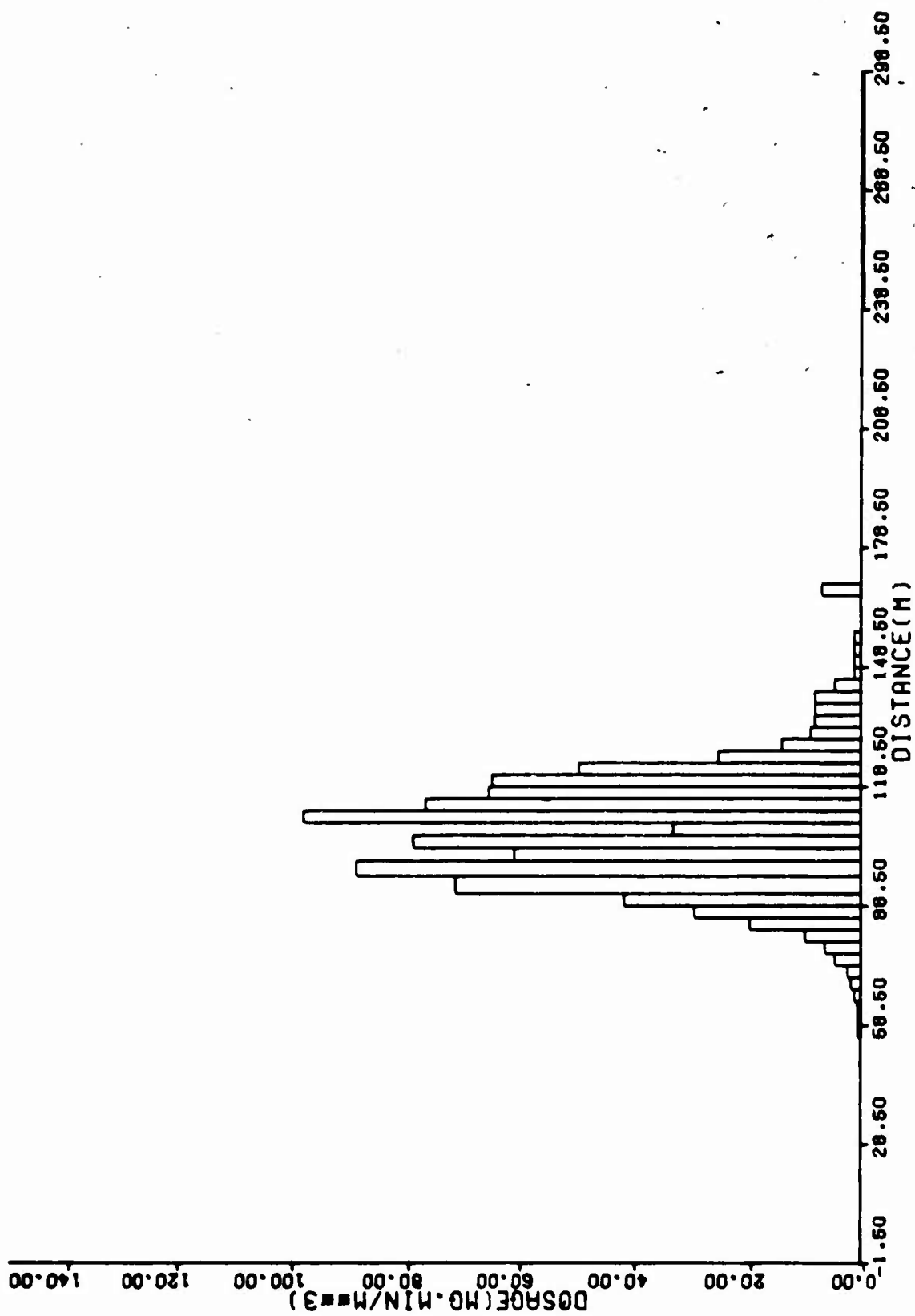
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1341:01	8	5	5
1341:11	53	27	10
1341:21	120	37	15
1341:31	163	56	16
1341:41	217	58	17
1341:51	291	63	18
1342:01	329	69	18

SKY BRIGHTNESS

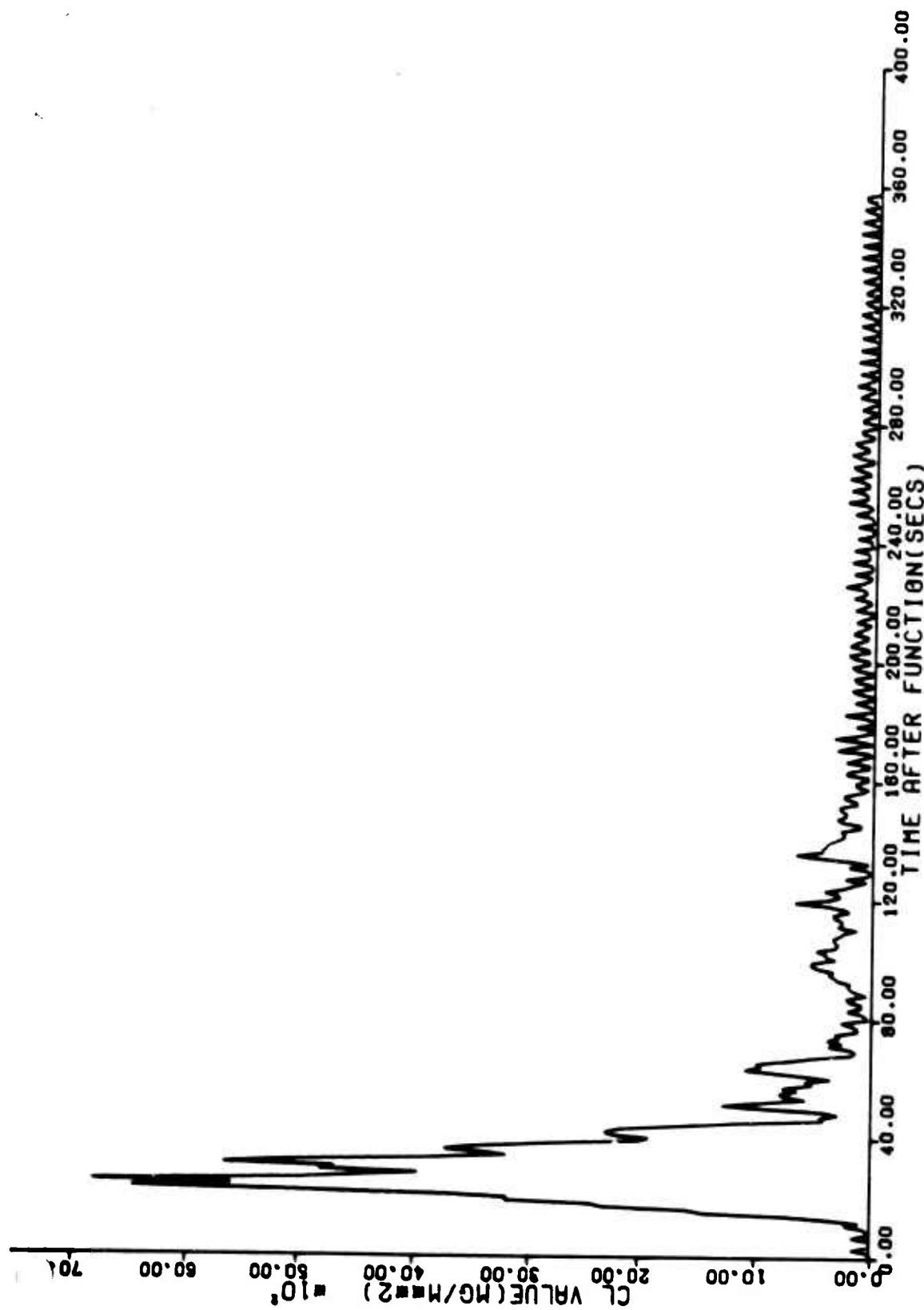
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	552
5	1300
10	1300
15	1300
20	1640
25	1984
30	1984
35	1984
40	1640
45	1640

Viewing azimuth 240° except 255° at 0 degrees elevation

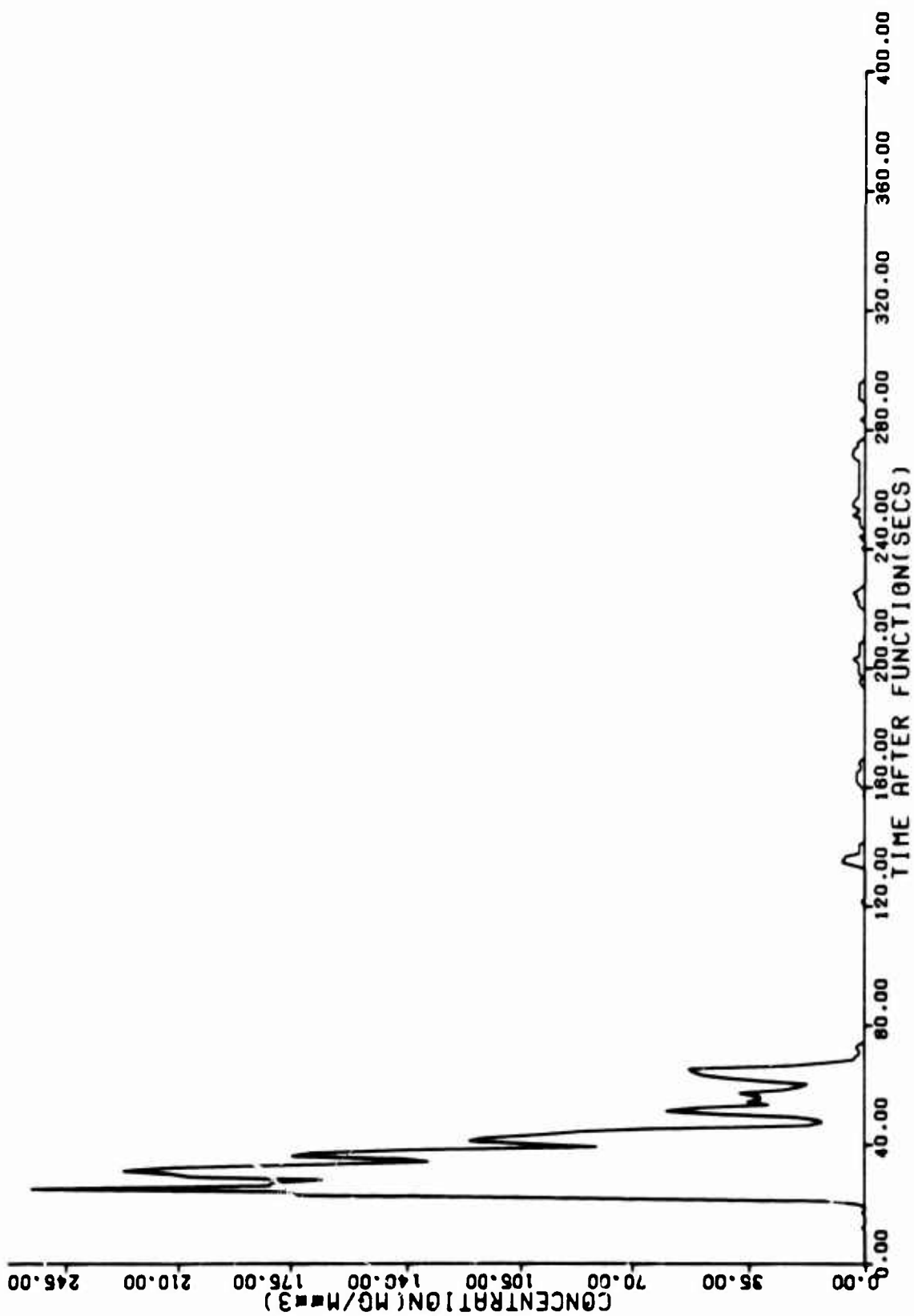


TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE



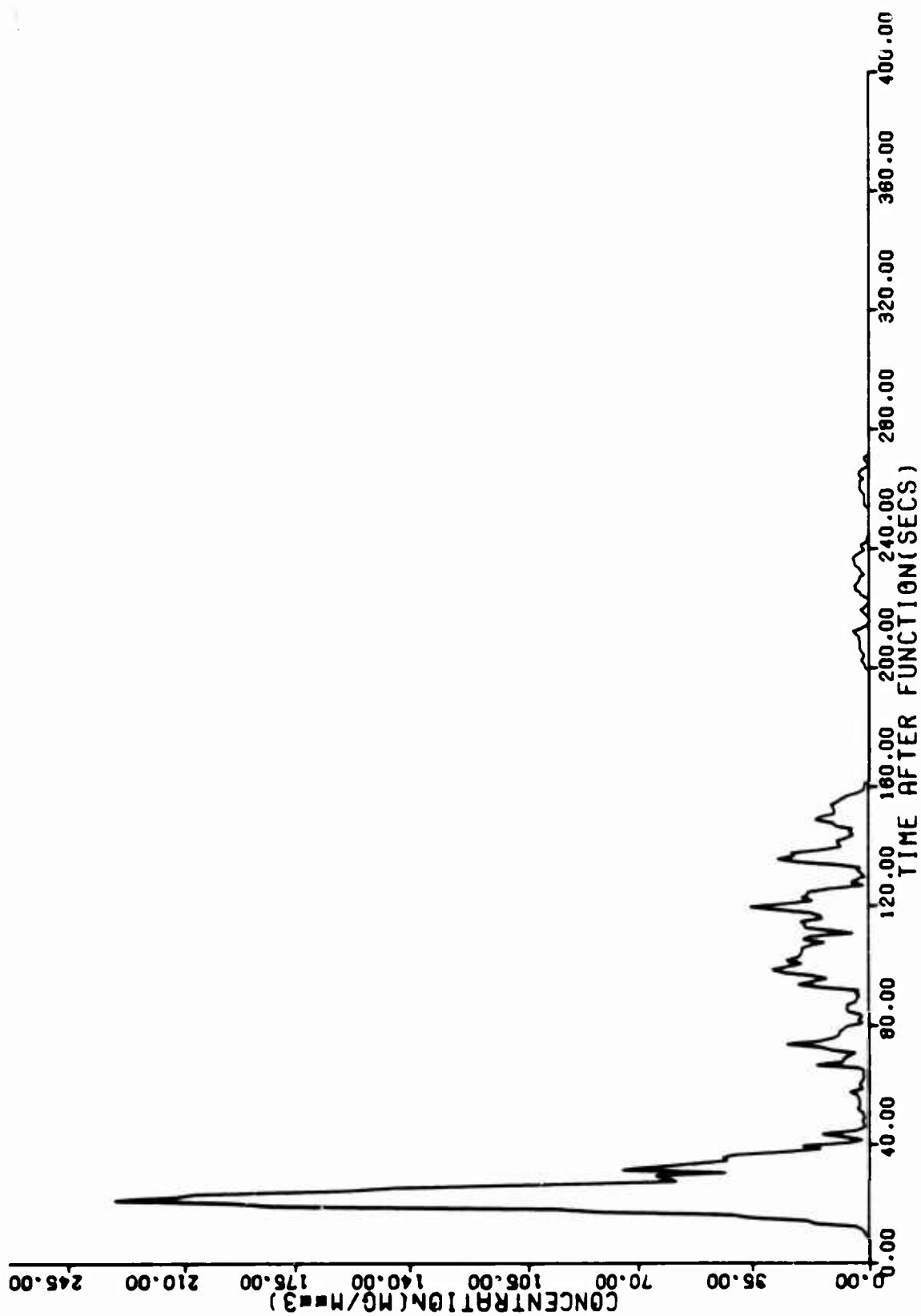
TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



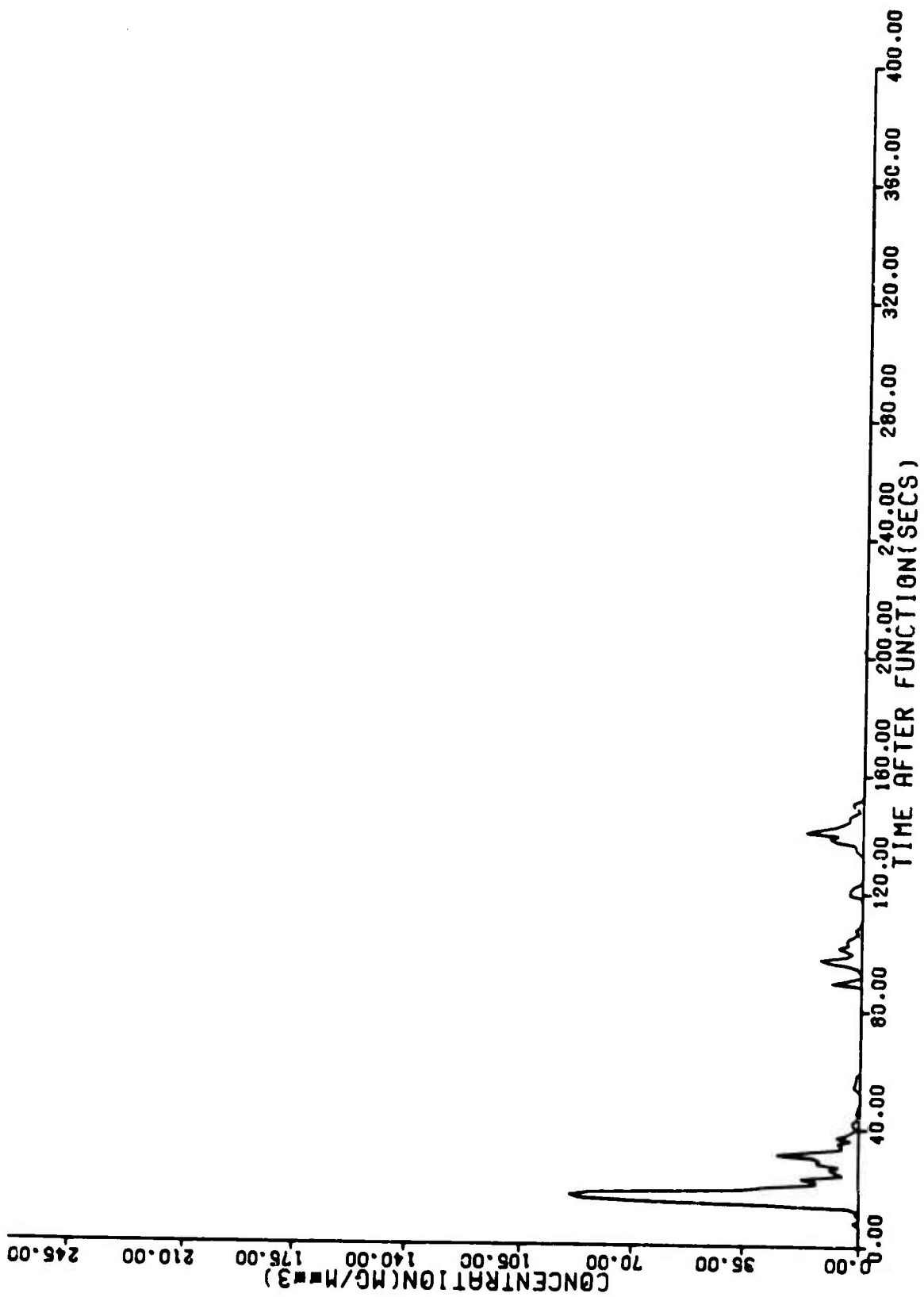
TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE

AEROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



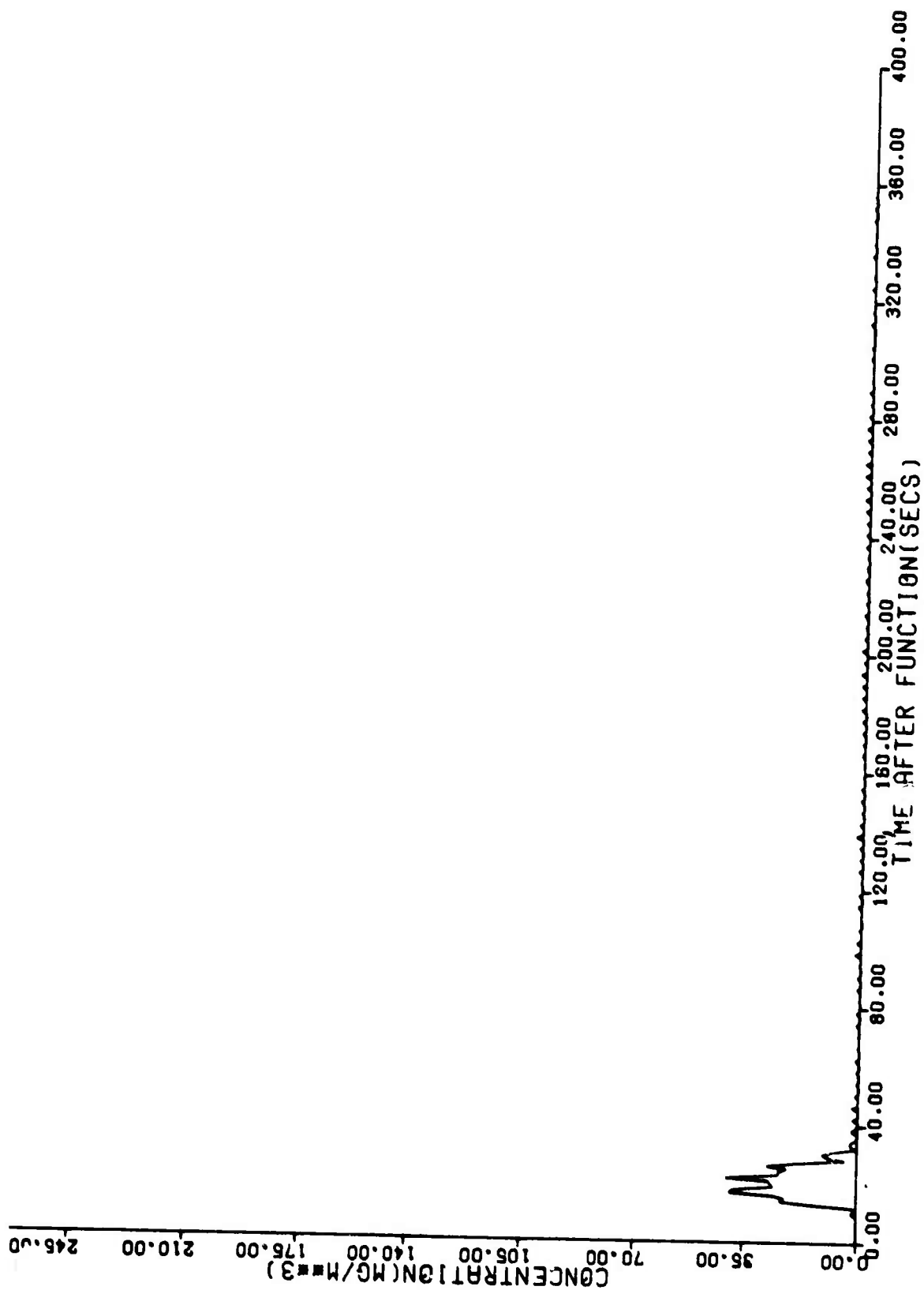
TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE

AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00



TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE

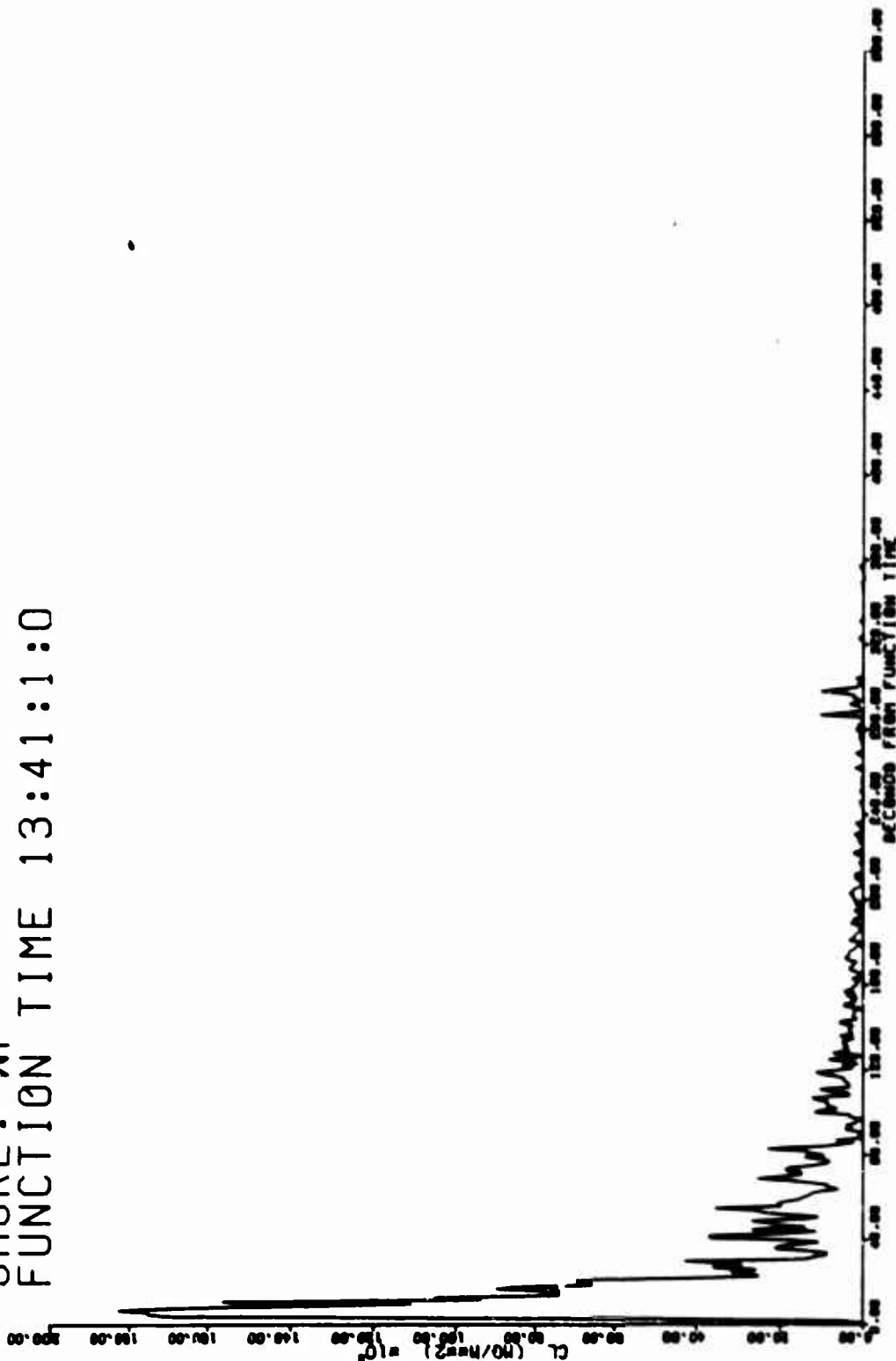
AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 21 (DP-1002), 5 OCT 1977, 13:41:01, WP SMOKE

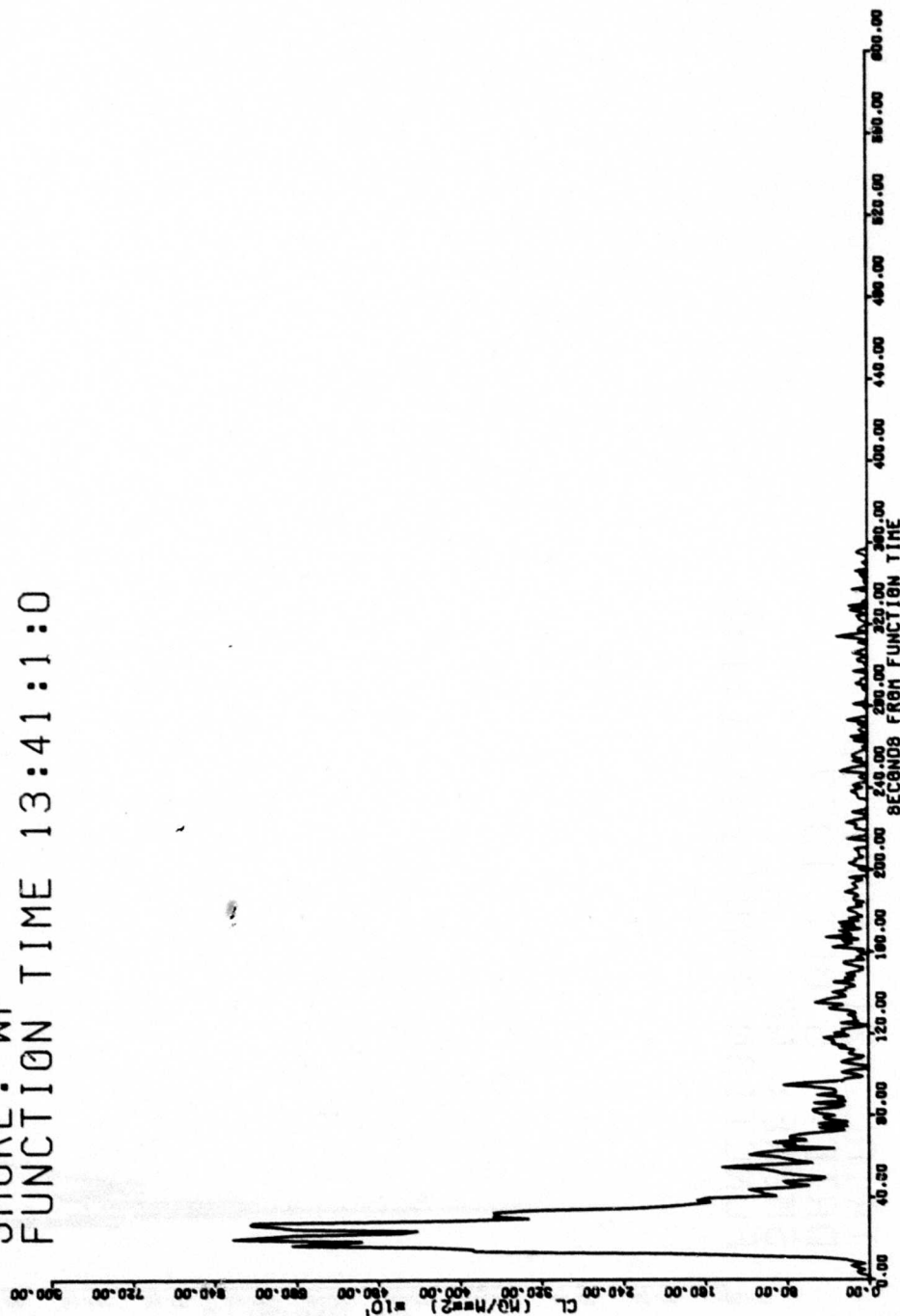
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0



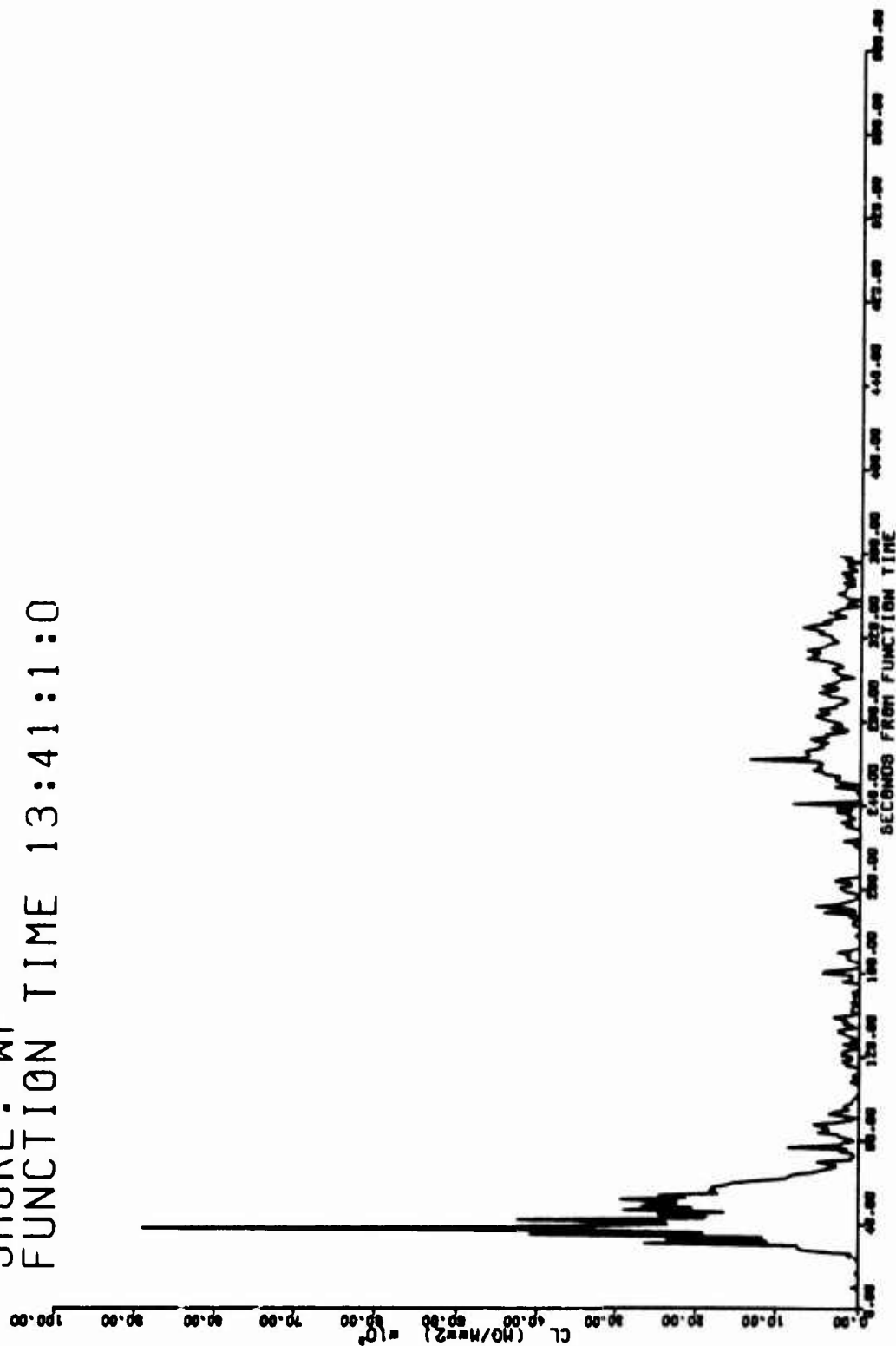
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0



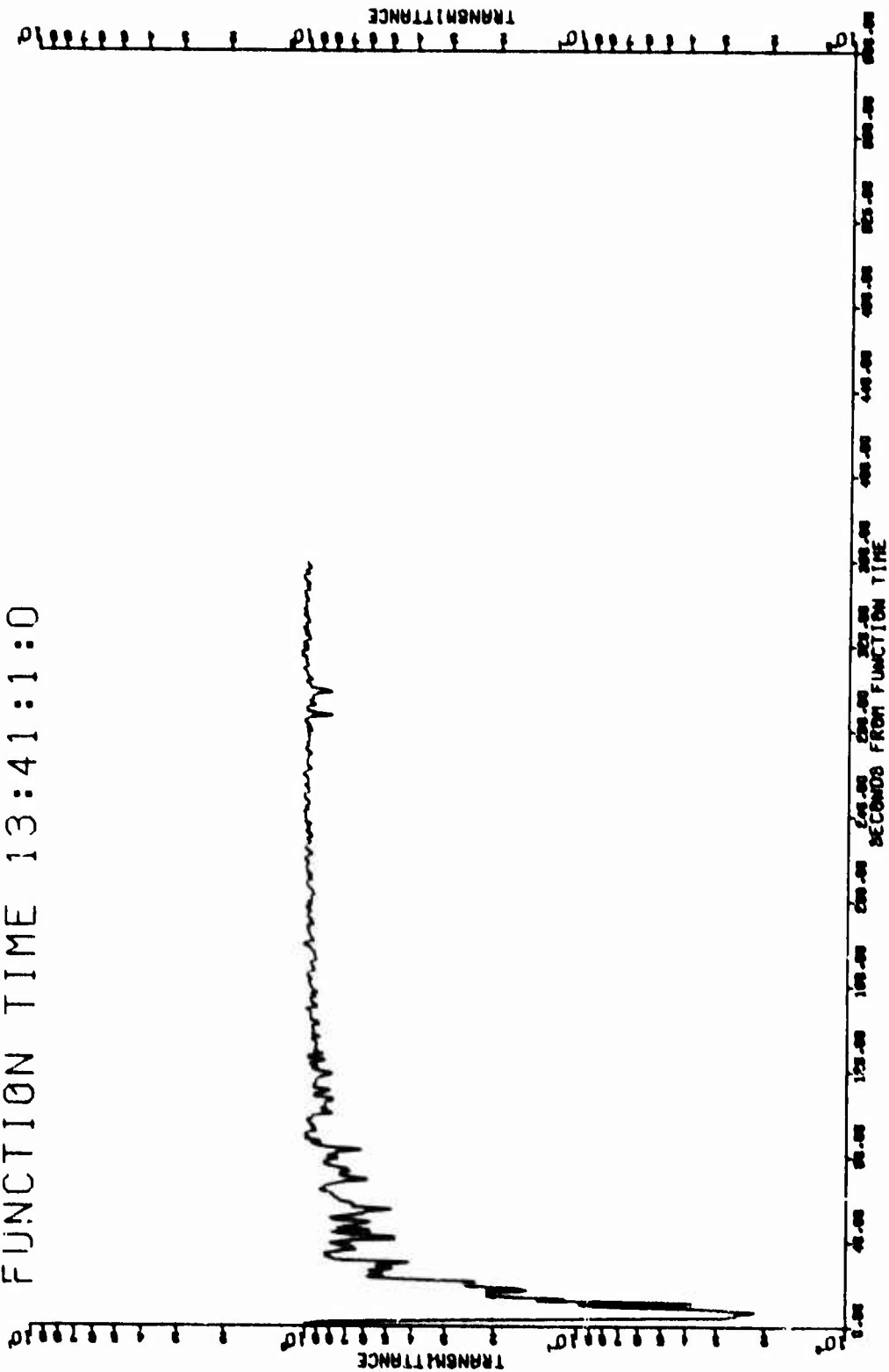
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0



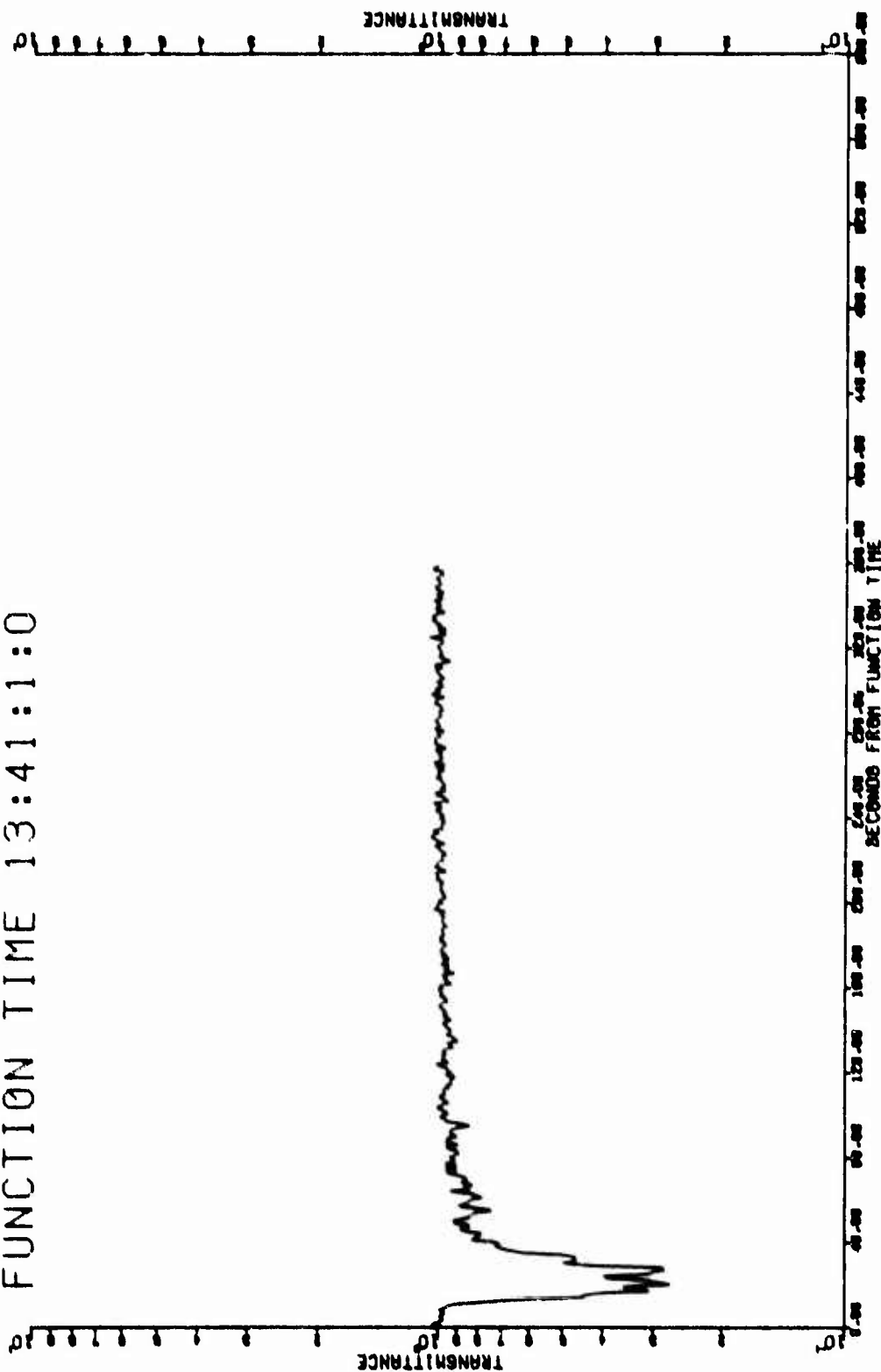
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:1:0



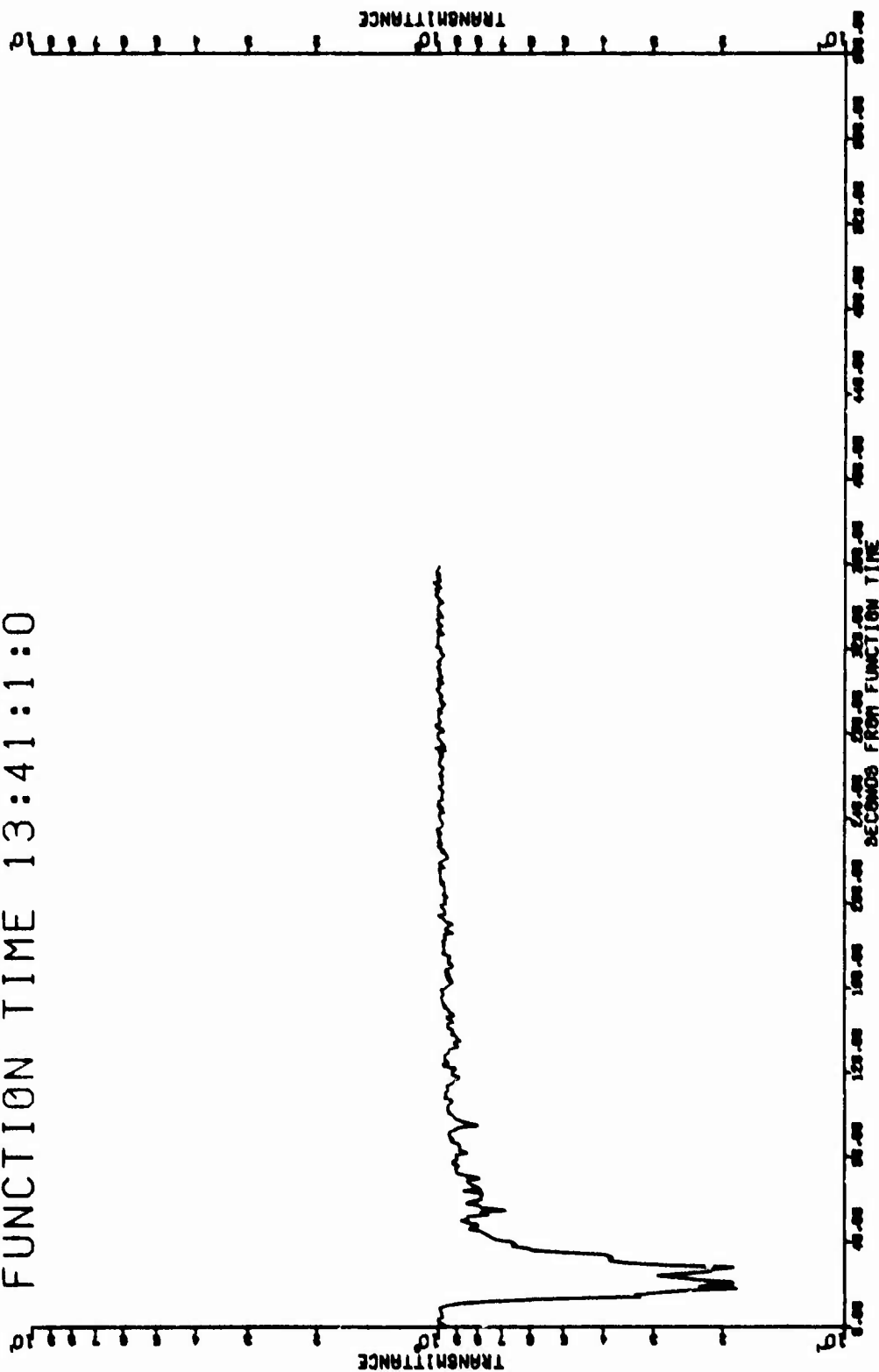
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:1:0



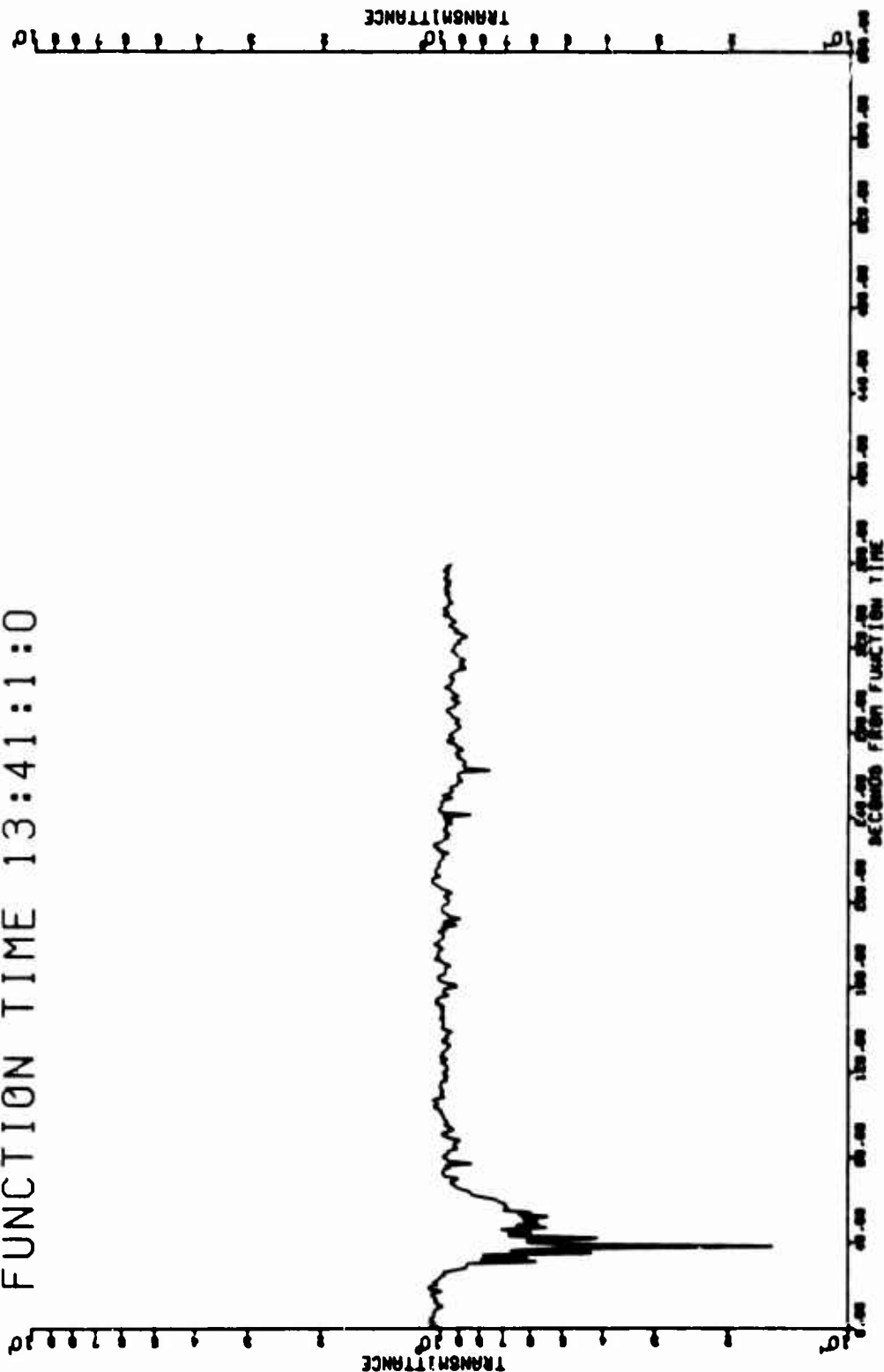
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:1:0



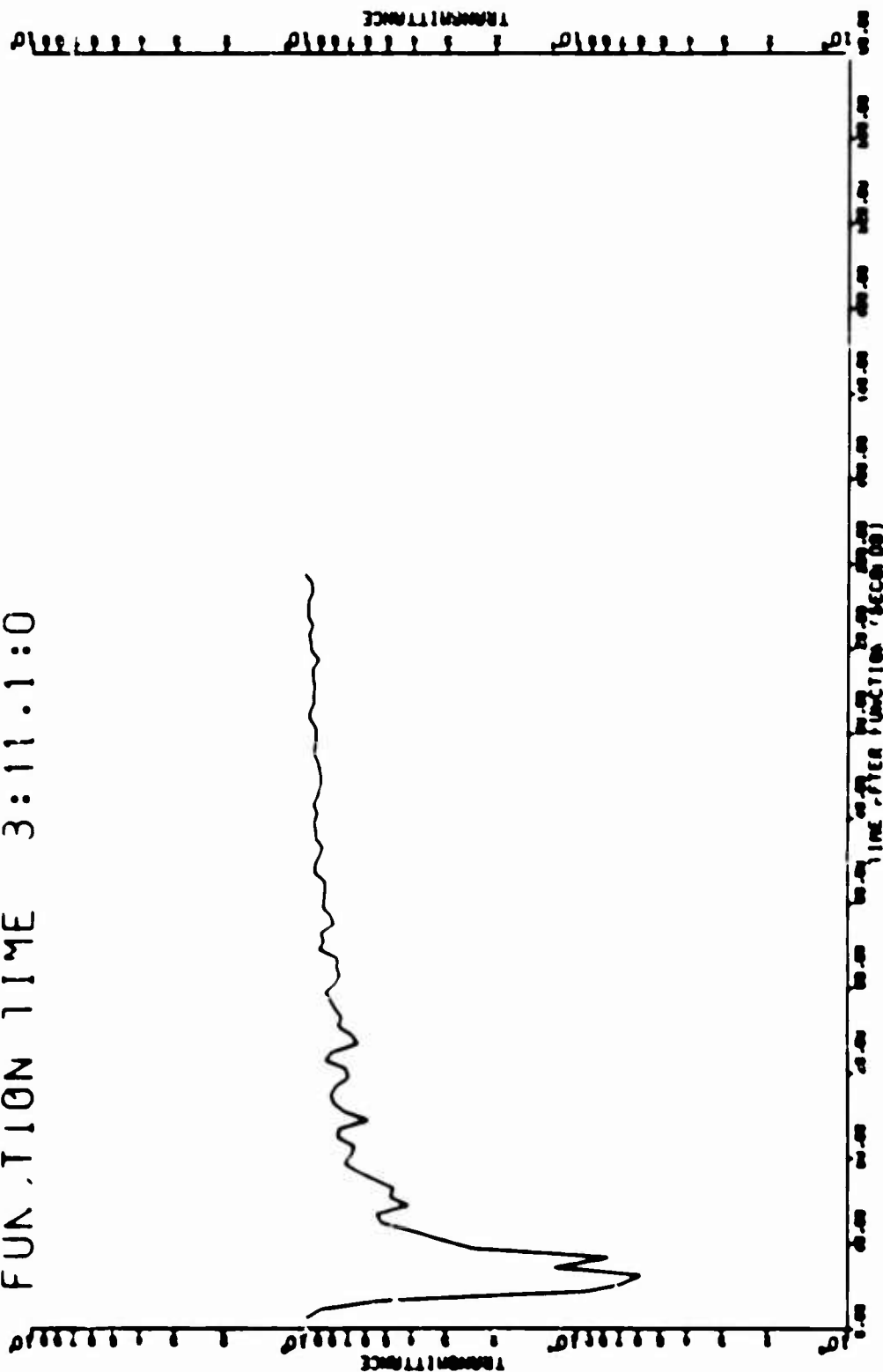
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:1:0



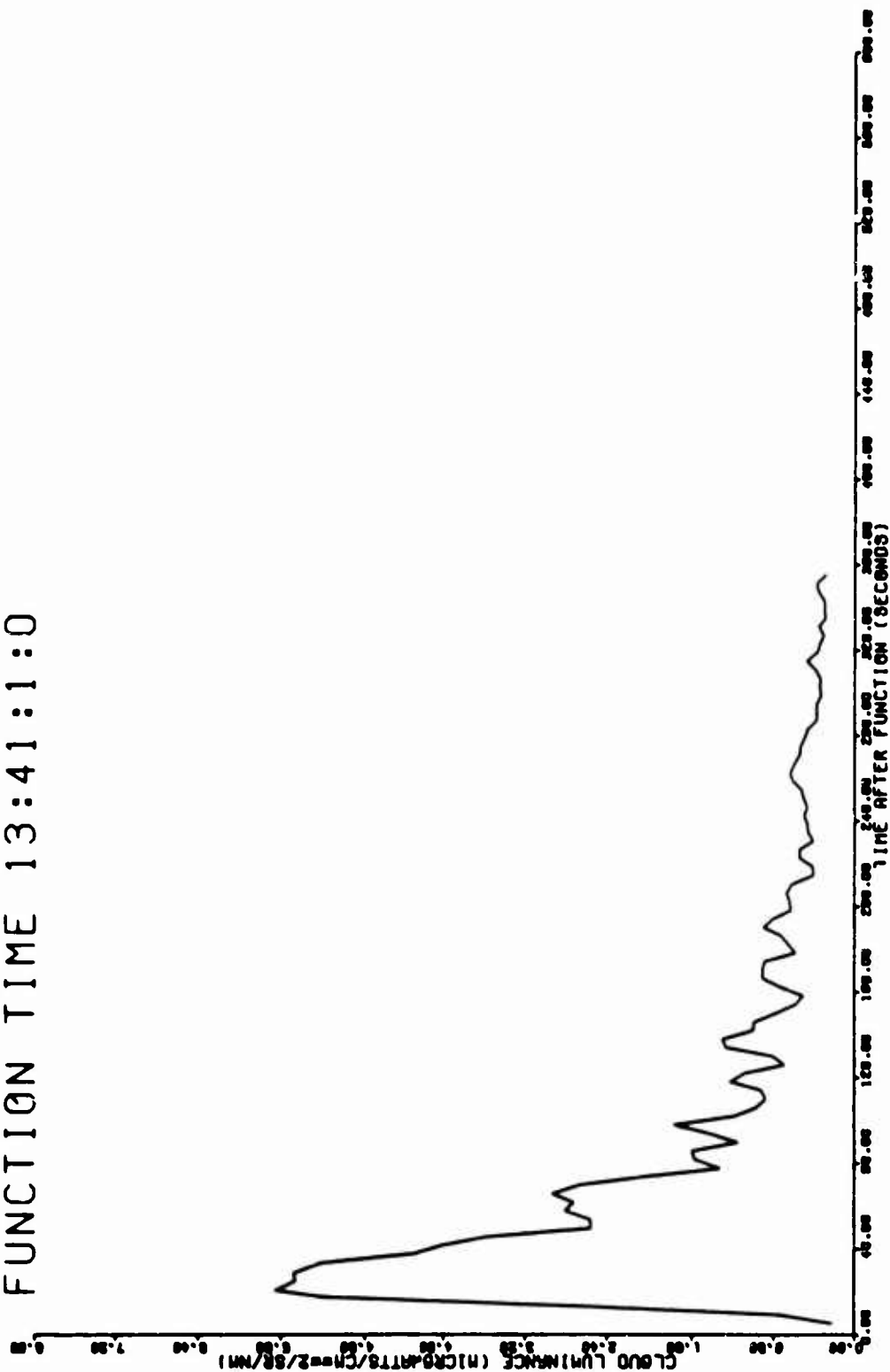
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW G

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 MOKE: WP
 FUNCTION TIME 3:11.1:0



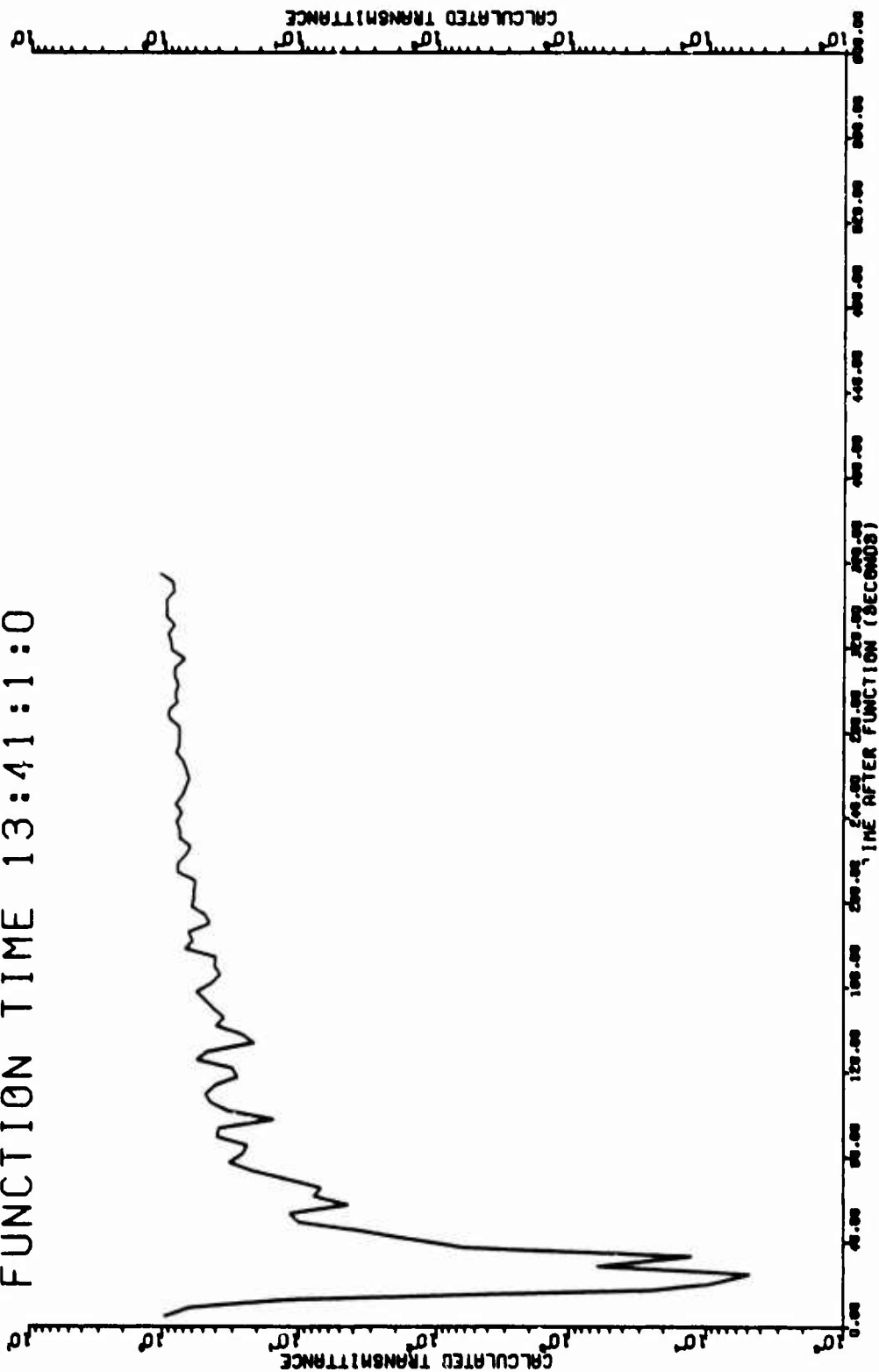
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #21 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:10



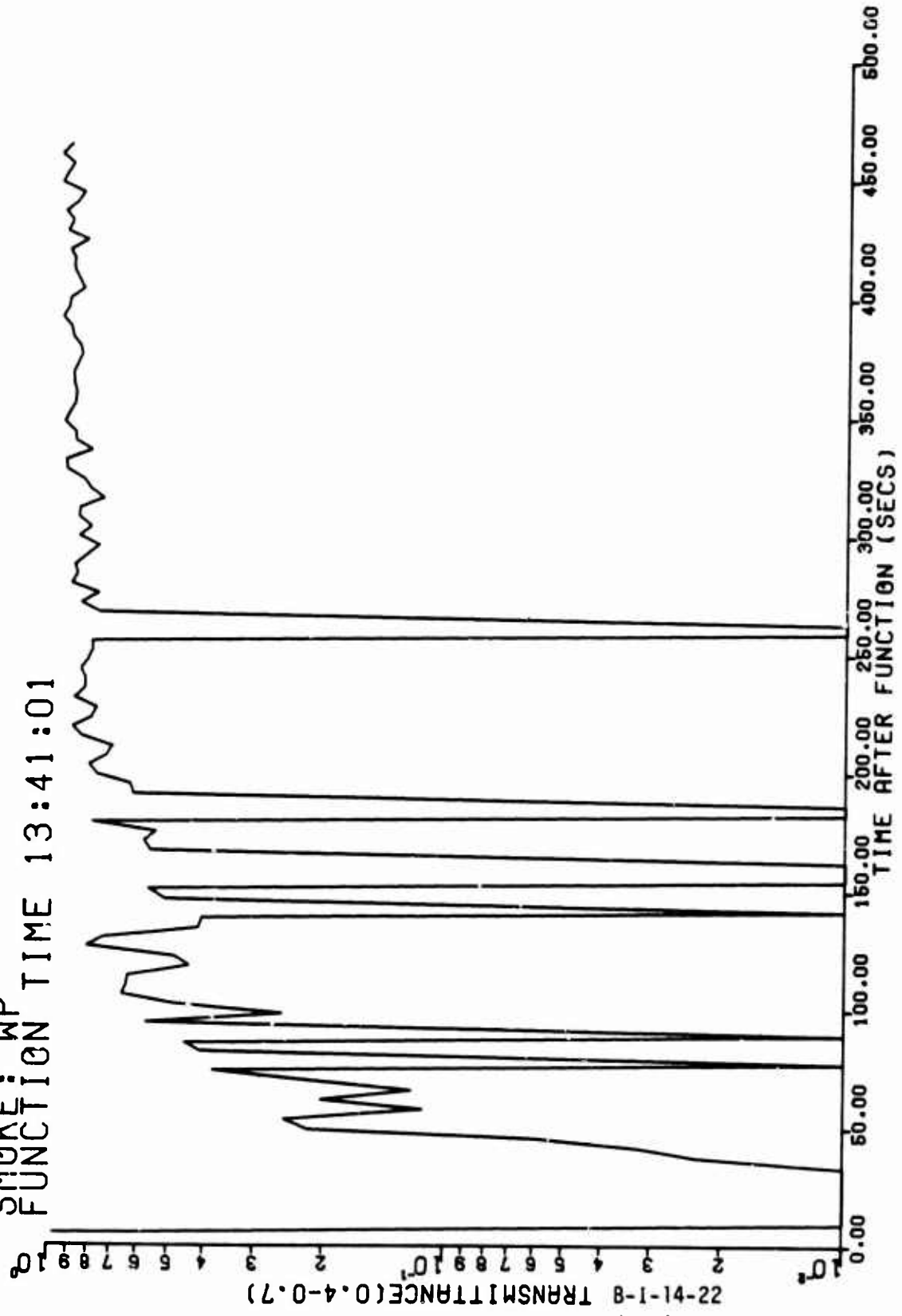
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0



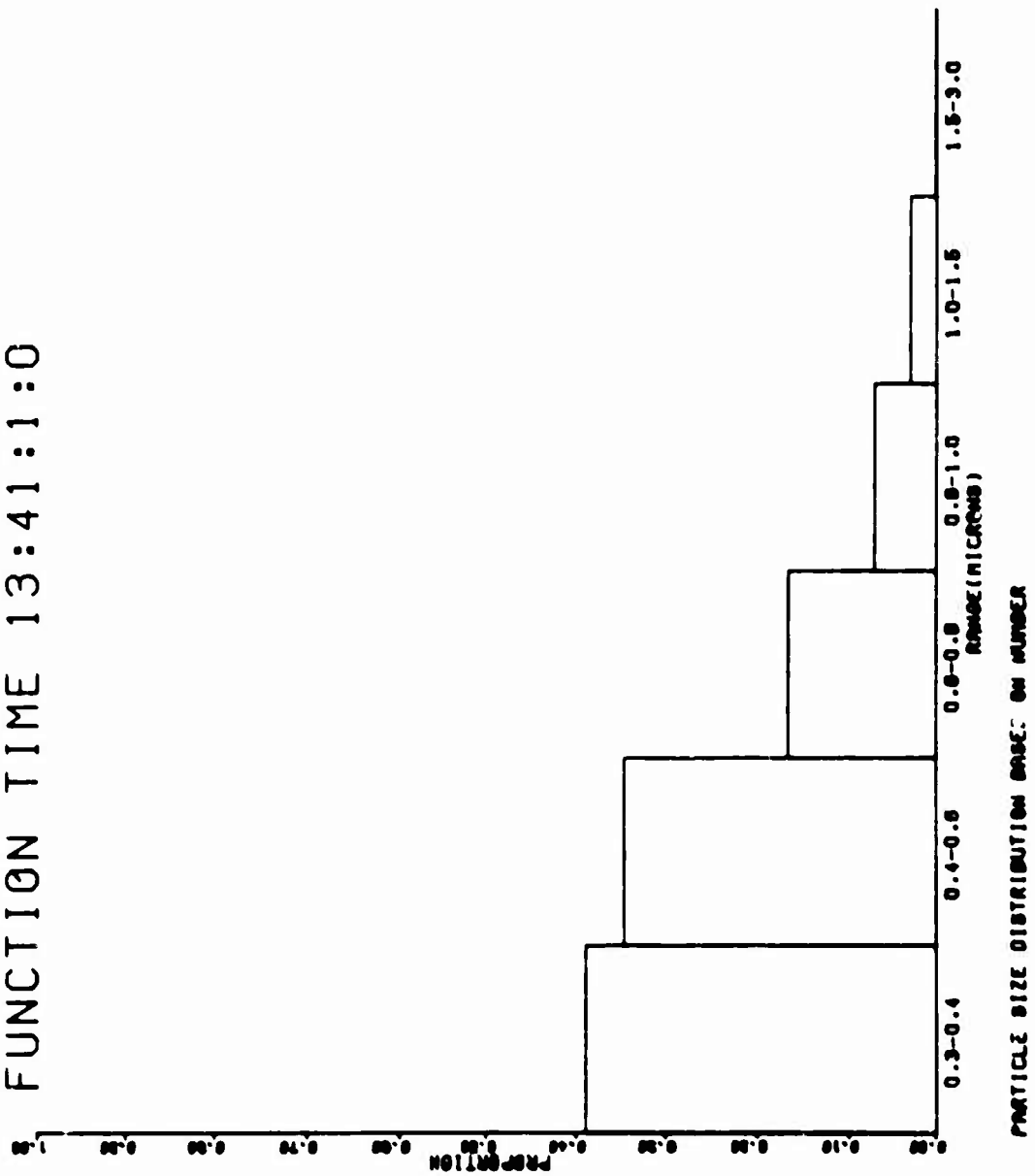
CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 21 (DP-1002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 13:41:01



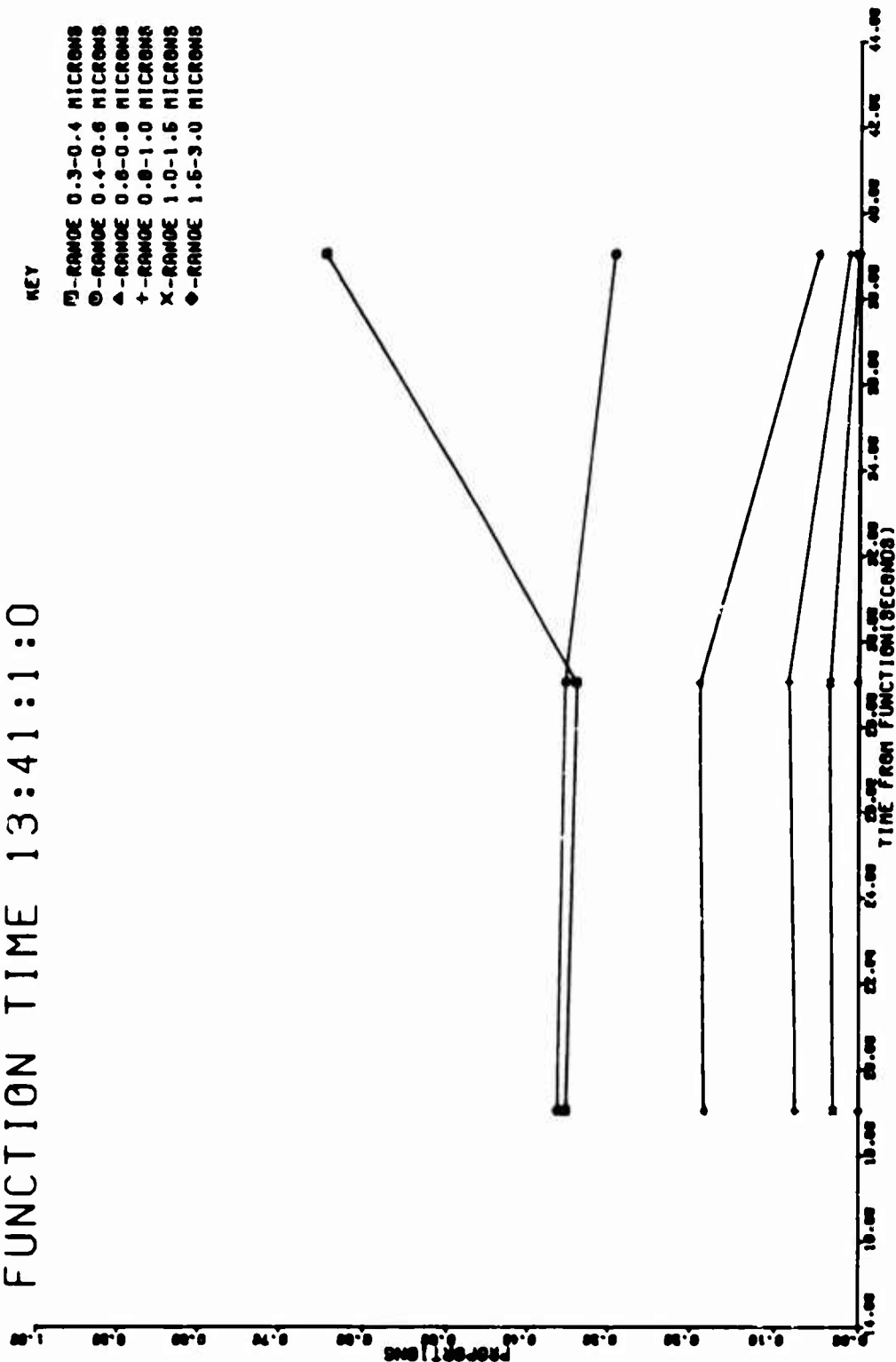
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0



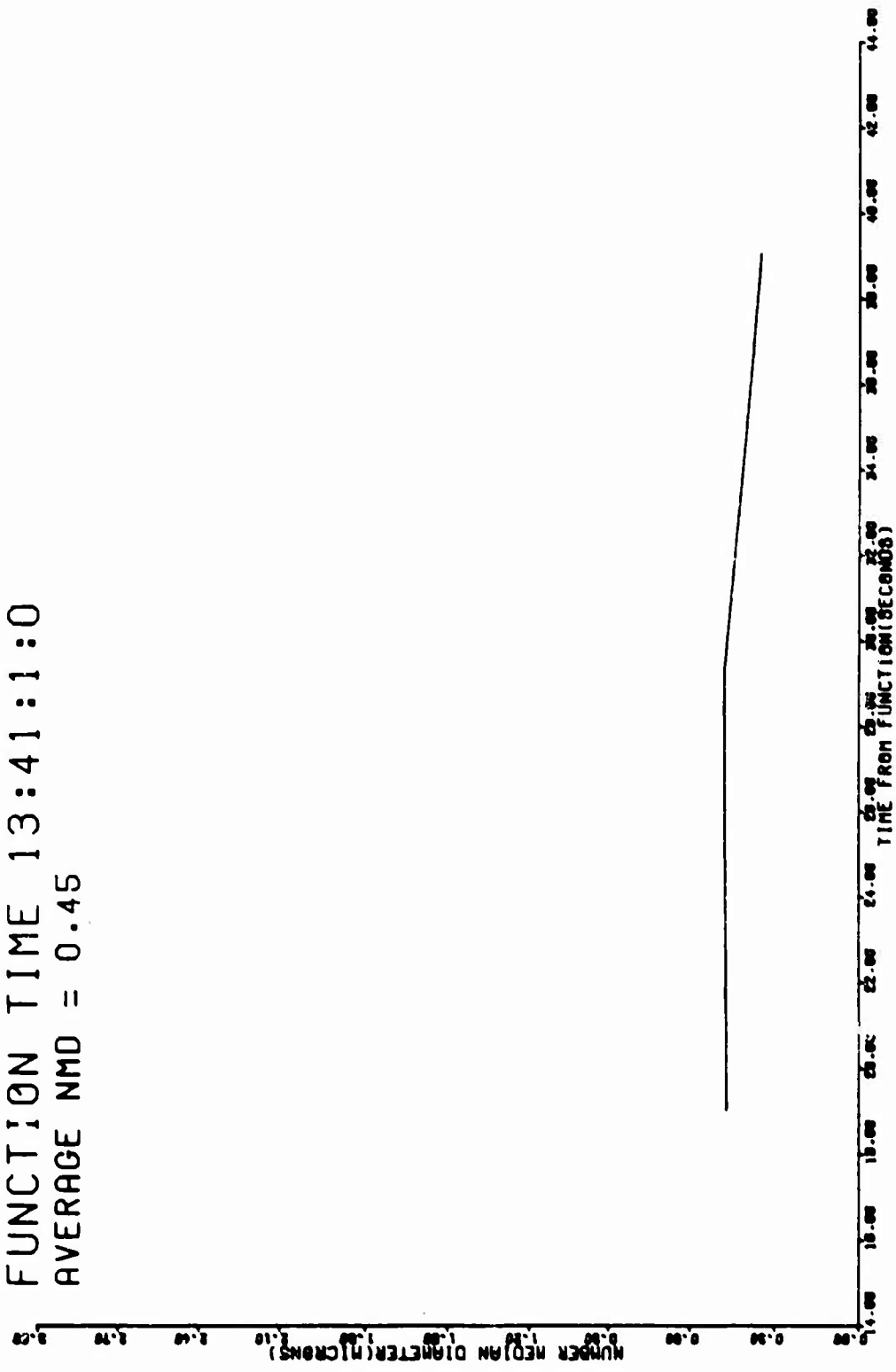
TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0

KEY
 M-RANGE 0.3-0.4 MICRONS
 O-RANGE 0.4-0.6 MICRONS
 A-RANGE 0.6-0.8 MICRONS
 + -RANGE 0.8-1.0 MICRONS
 X-RANGE 1.0-1.5 MICRONS
 ◆ -RANGE 1.5-3.0 MICRONS



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #21 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:41:1:0
 AVERAGE NMD = 0.45



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-15

TRIAL DP1-002-T-22 (WP SMOKE) 5 OCT 1977

SUMMARY OF TEST DATA	B-I-15-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-15-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-15-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-15-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-15-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-15-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-15-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-15-21
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-15-22
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-15-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-15-24
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-15-25
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-15-26
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-15-27
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-15-28

FIGURE:	FLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	ND
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-15-29
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-15-30
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-15-31

SUMMARY OF TEST DAY DATA

Trial: 22

Date: 5 Oct 77

Time: 1433:01 MDT

Wind Direction (Transport) (degrees) (4m)	181
Mean Wind Speed (Transport) (\bar{u} , m/sec)	5.0
Temperature at 2-meters, Trial Time, (T, °C)	26.4
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	11.1
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	3.7
Temperature Gradient, 0.5-8m (ΔT , °C)	-3.4
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.18
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	24
Solar Azimuth (deg)	204.5
Solar Altitude (deg)	42.0
Air Density - ρ (kg m ⁻³)	1.012
Solar Radiation (Langley's per minute)	1.084
Barometric Pressure (millibars)	867.0
Visibility (km)	137
Reflectivity, OD Target	0.11
Haze (footlamberts)	57
Brightness, Background (footlamberts)	1260
Brightness, White Target (footlamberts)	1419
Brightness, OD Target	210
Percent Opaque Cloud Cover	4

Munitions/Submunitions Used (WP, 155mm) 3

Number of Munitions/Submunitions Functioned 3

Particle Size Range (micron)

(0.3 - 0.4) ND

(0.4 - 0.6) ND

(0.6 - 0.8) ND

(0.8 - 1.0) ND

(1.0 - 1.5) ND

(1.5 - 3.0) ND

Log₁₀NMD ND

^oLog₁₀NMD ND

NMD ND

MMD ND

*No data available

Initial Cloud Dimensions (Meters)

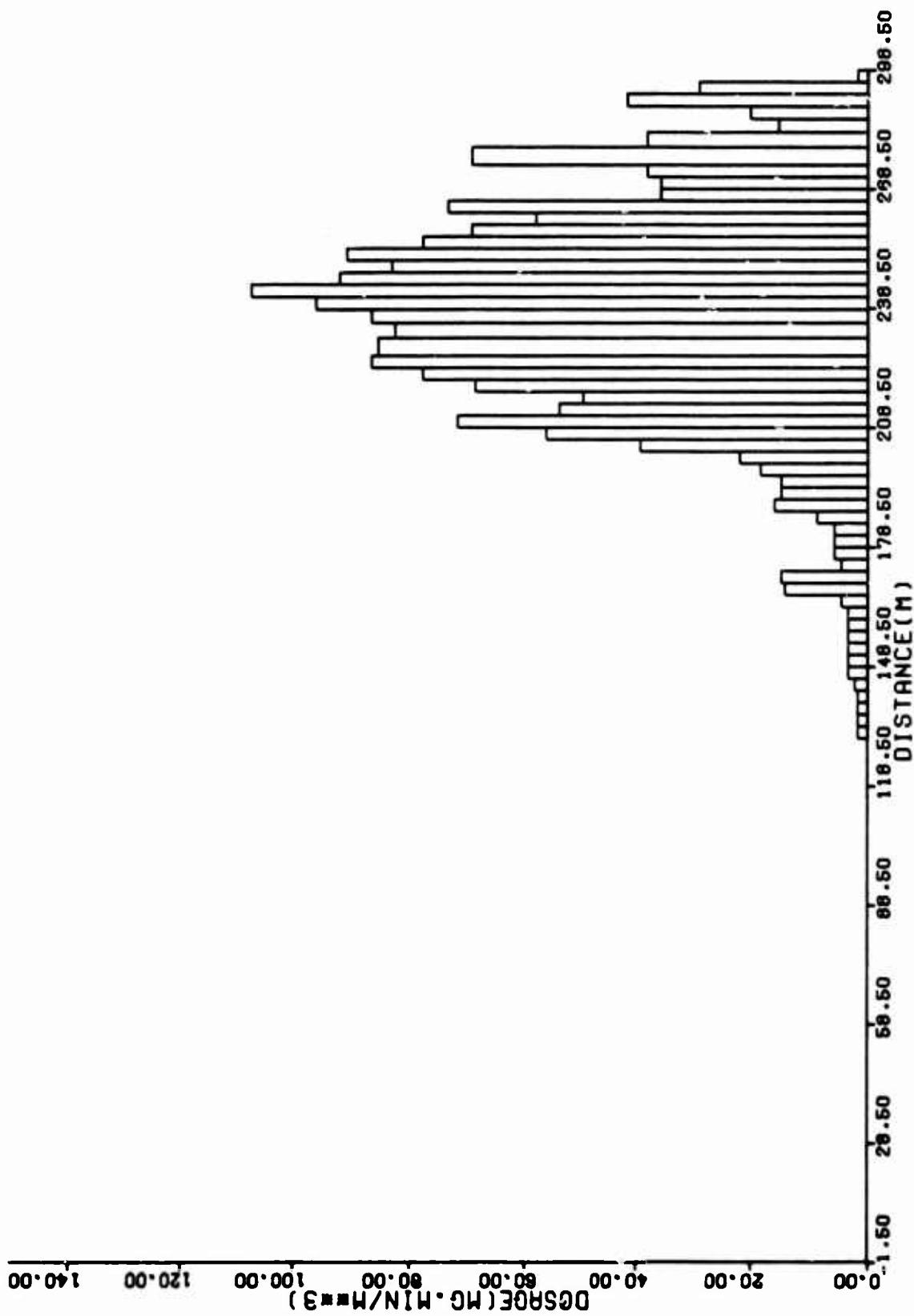
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1433:01	18	16	6
1433:11	86	51	36
1433:21	173	52	43
1433:31	413	58	46
1433:41	414	57	55
1433:51	Cloud aloft		

SKY BRIGHTNESS

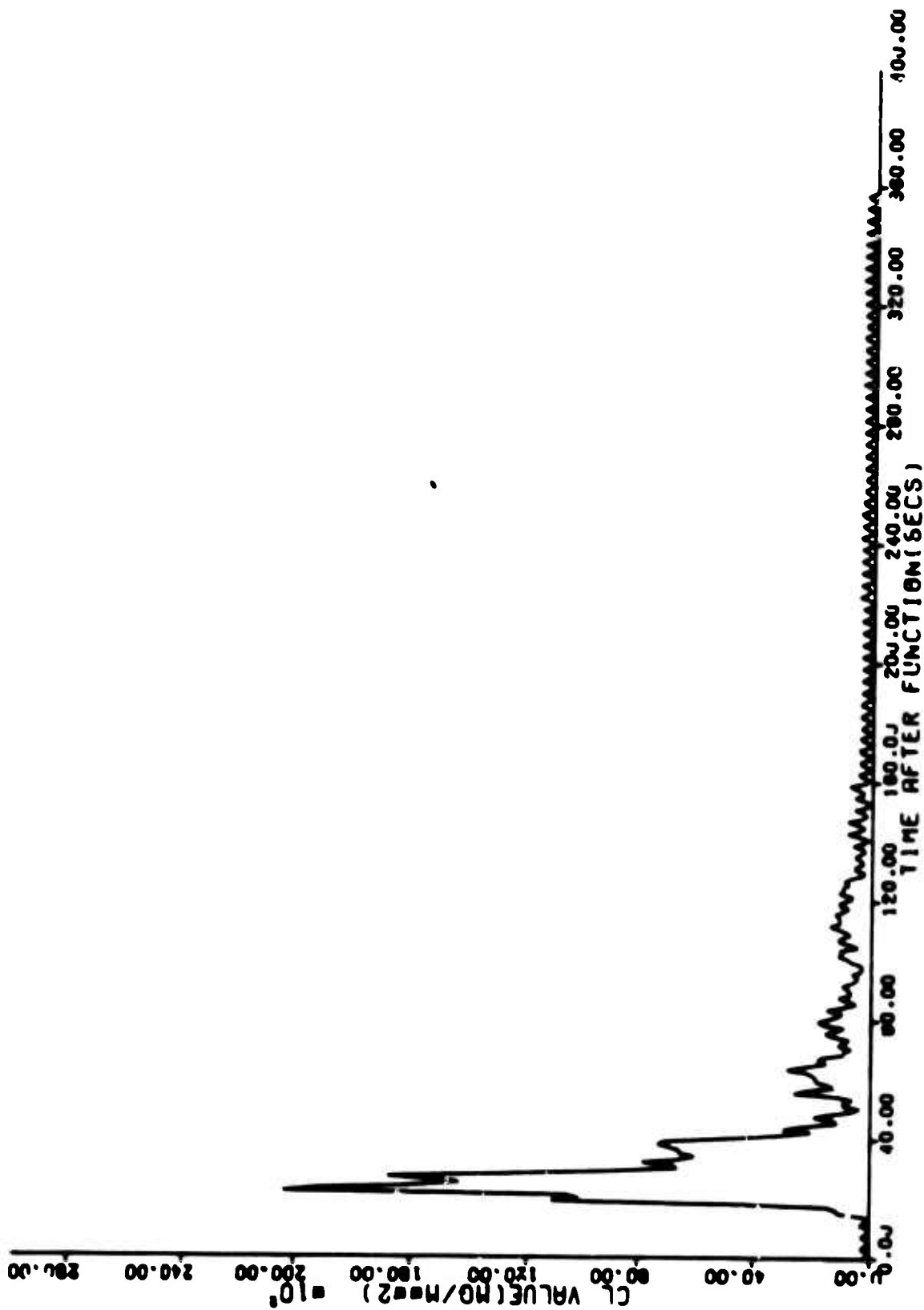
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	504
5	1140
10	1140
15	1140
20	1640
25	1640
30	1984
35	1640
40	1640
45	1640

Viewing azimuth 240° except 255° at 0 degrees elevation

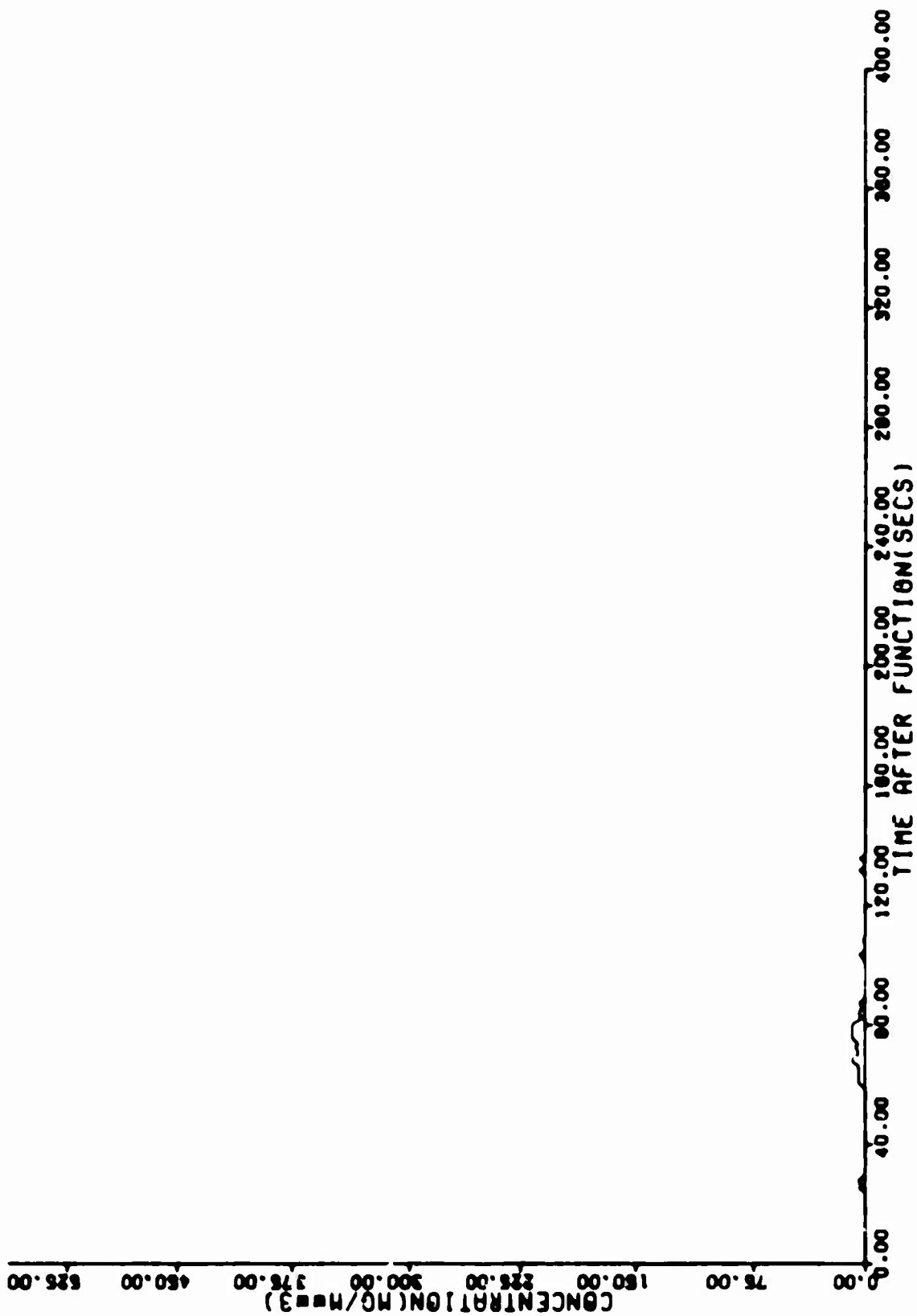


TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE



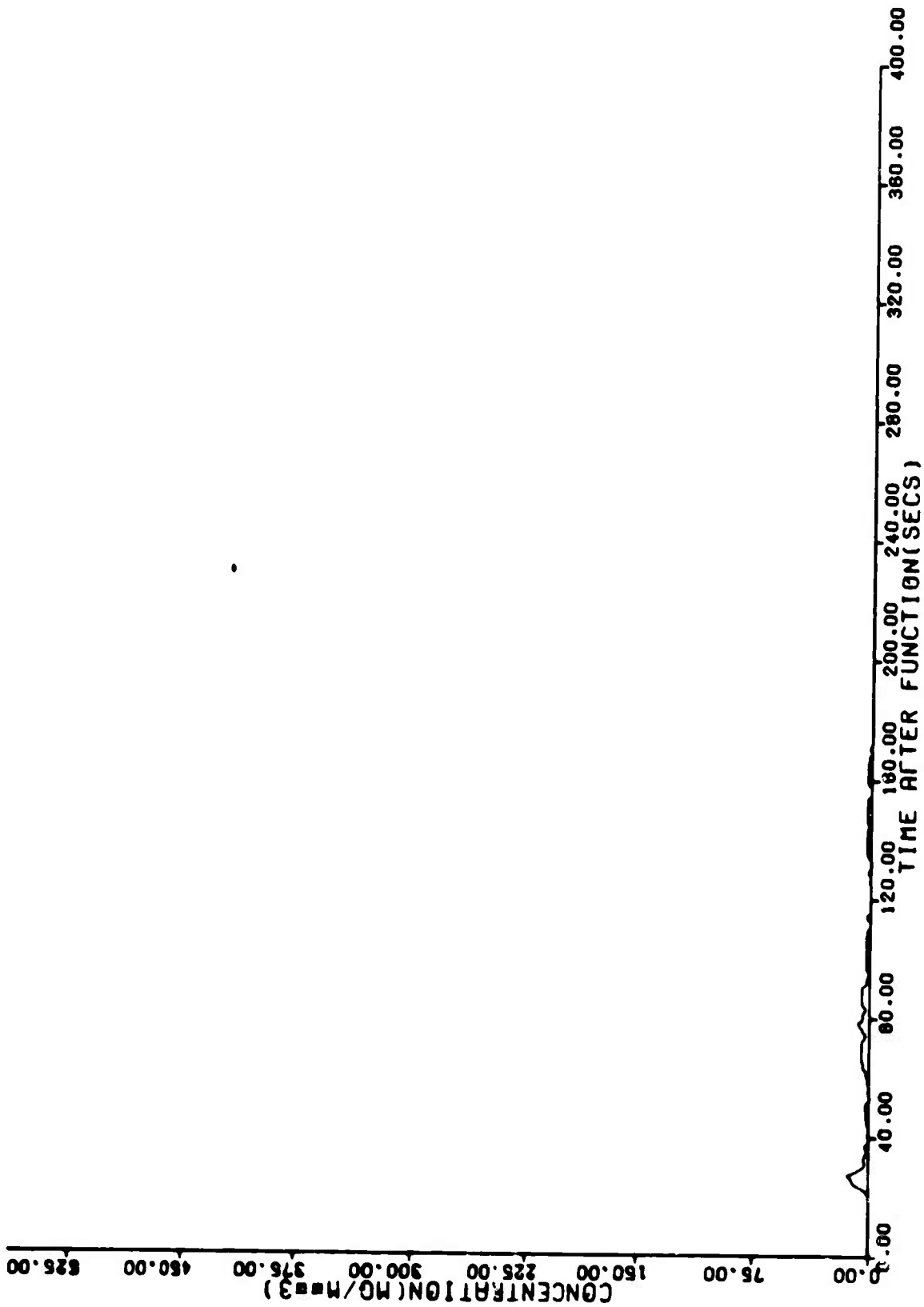
TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



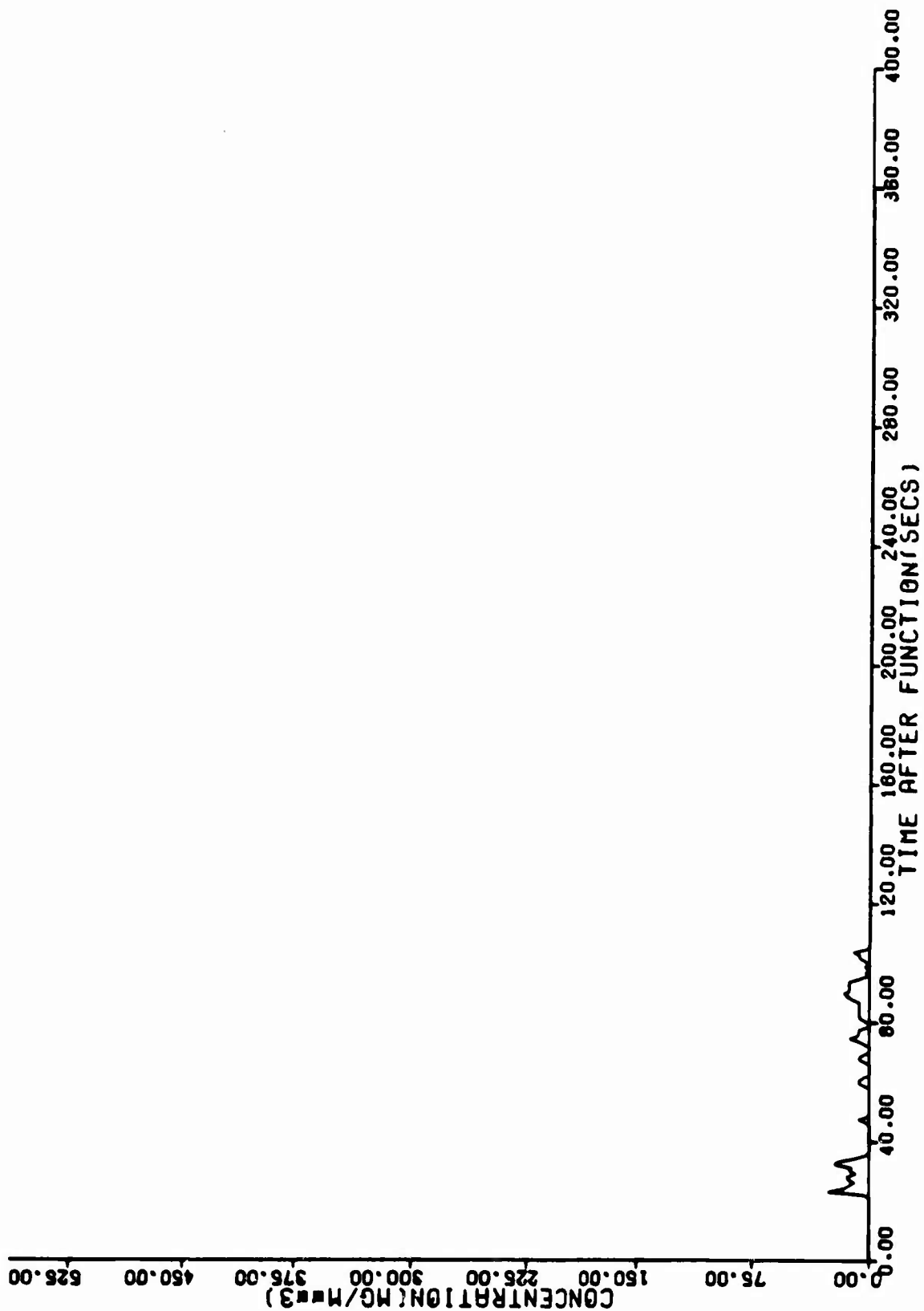
TRIAL 22 (DP-1002). 5 OCT 1977. 14:33:01. WP SMOKE

AEROSOL PHOTOMETER #11. X=0.00. Y=156.00. Z=0.00



TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

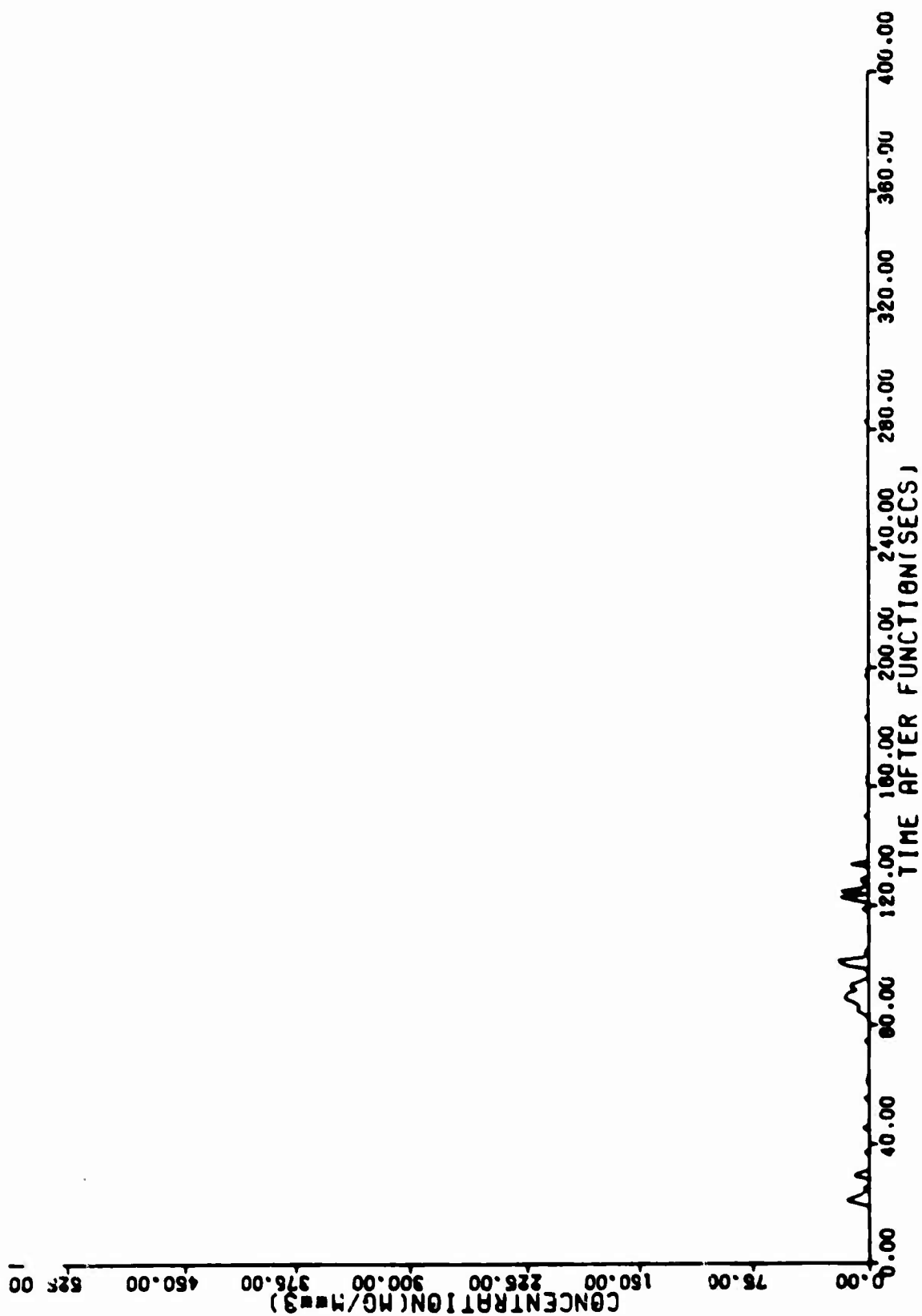
AEROSOL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

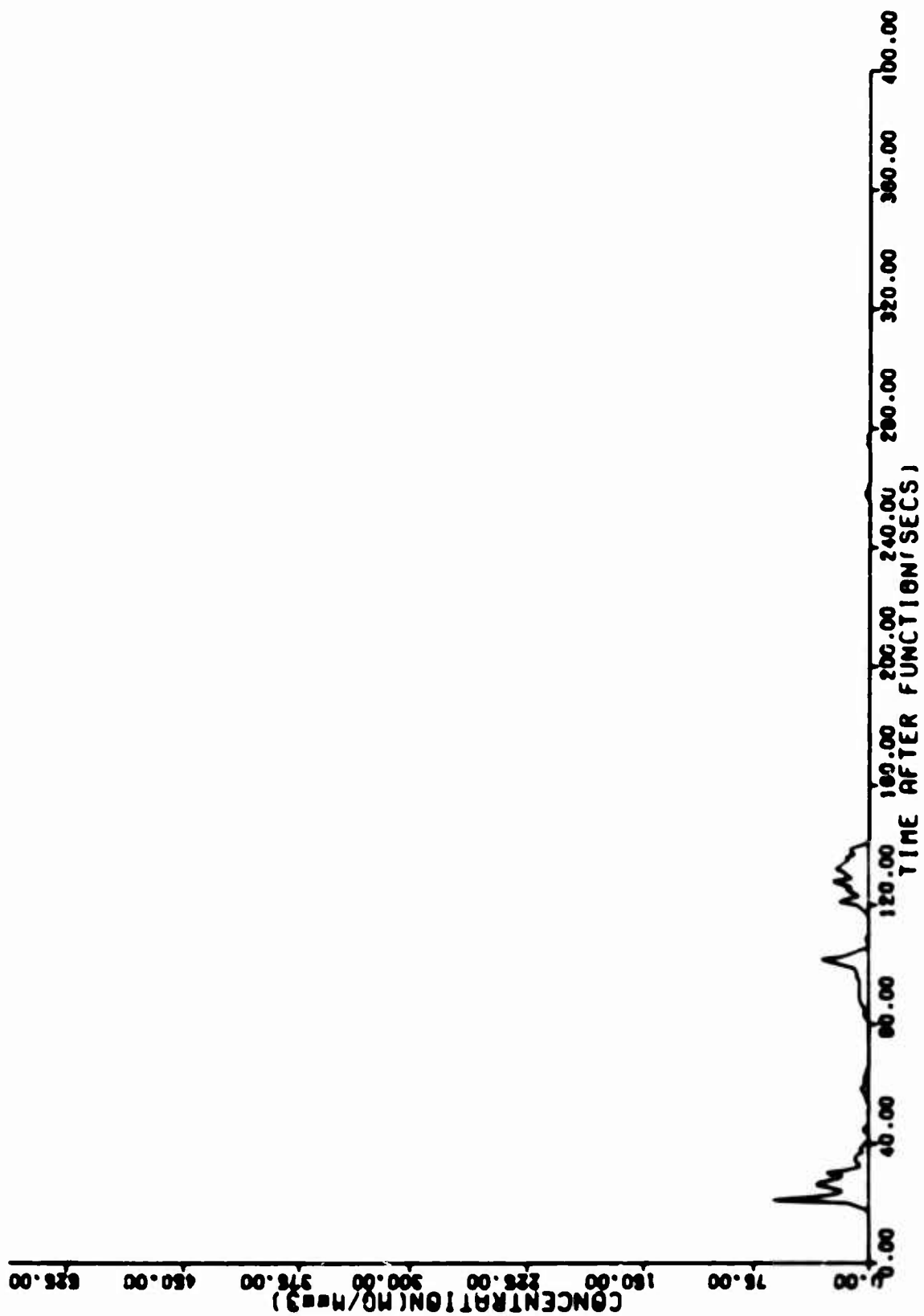
PEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00

8-1-15-11



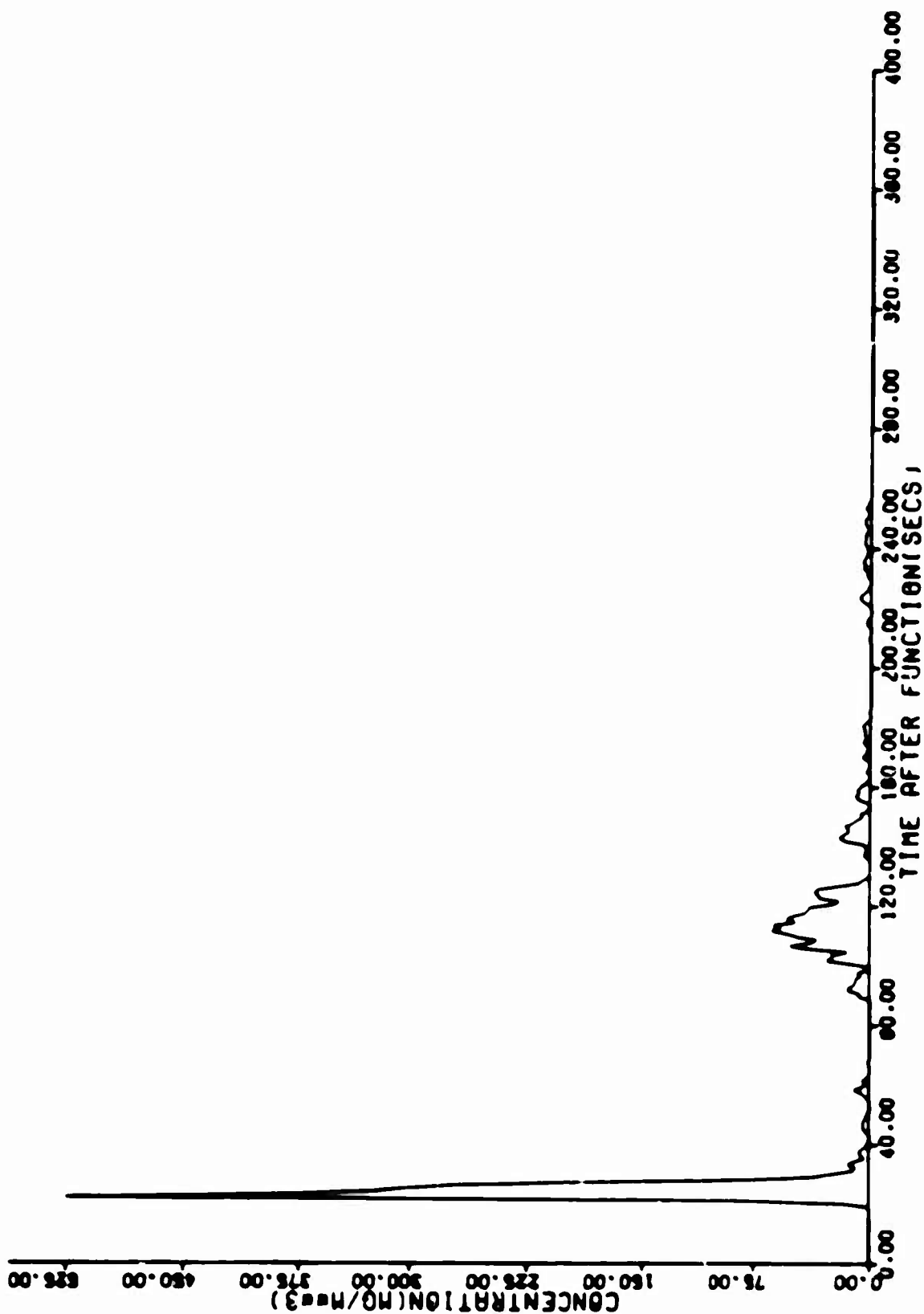
TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

AEROSOL PHOTOMETER *14, X=0.00, Y=183.00, Z=0.00



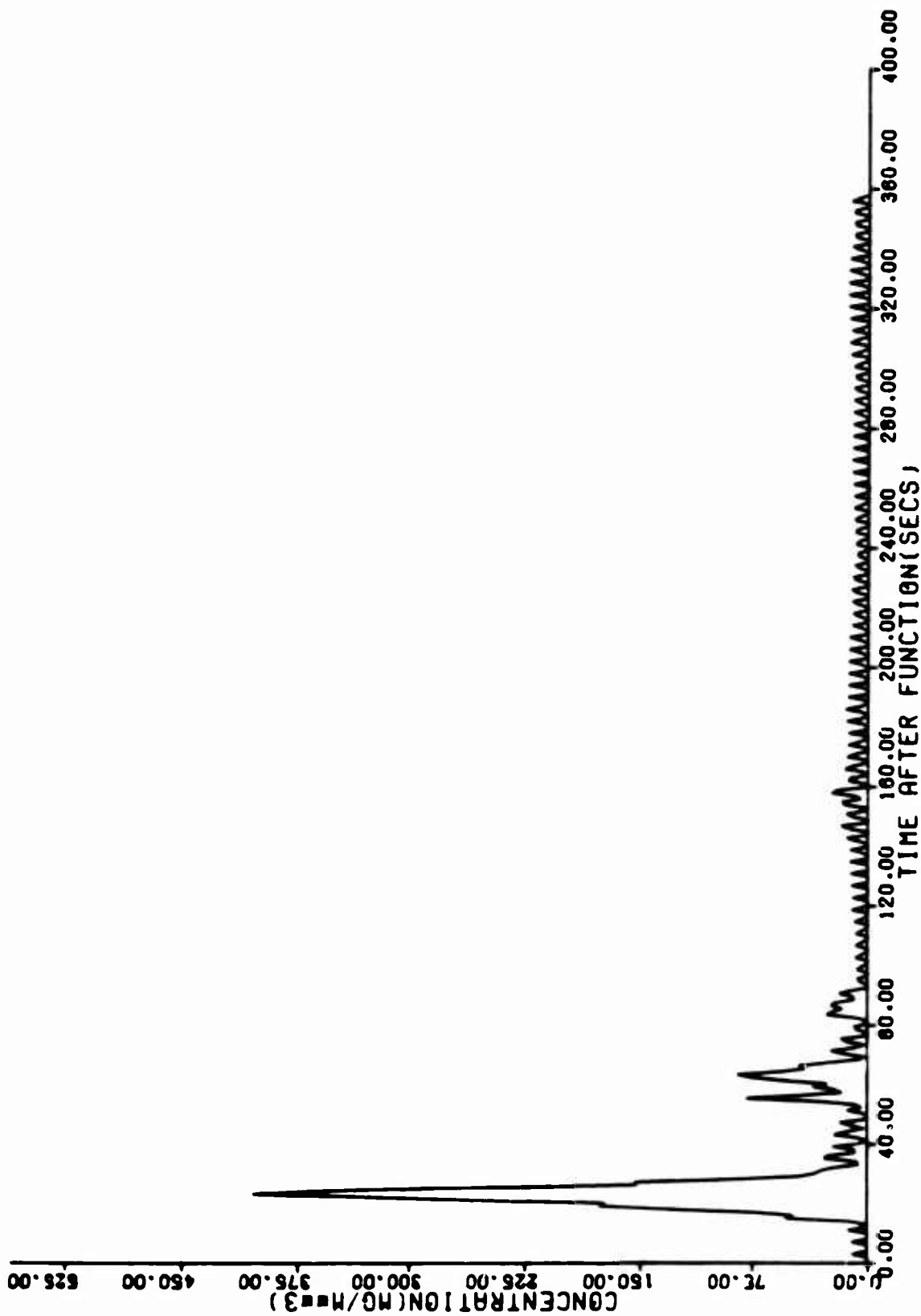
TRIAL 22 (DP-1002). 5 OCT 1977. 14:33:01. WP SMOKE

AEROSOL PHOTOMETER #15. X=0.00. Y=192.00. Z=0.00



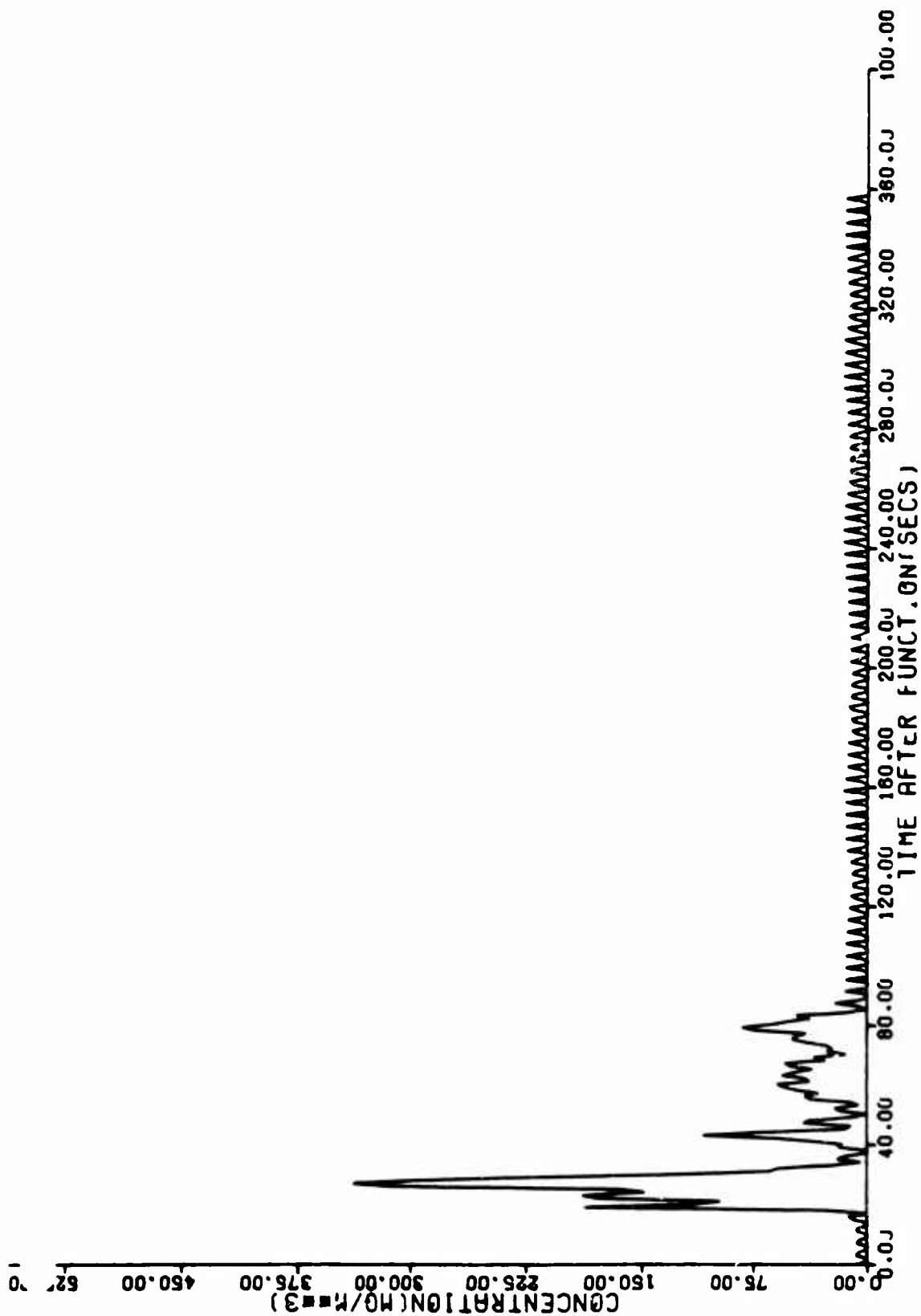
TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00



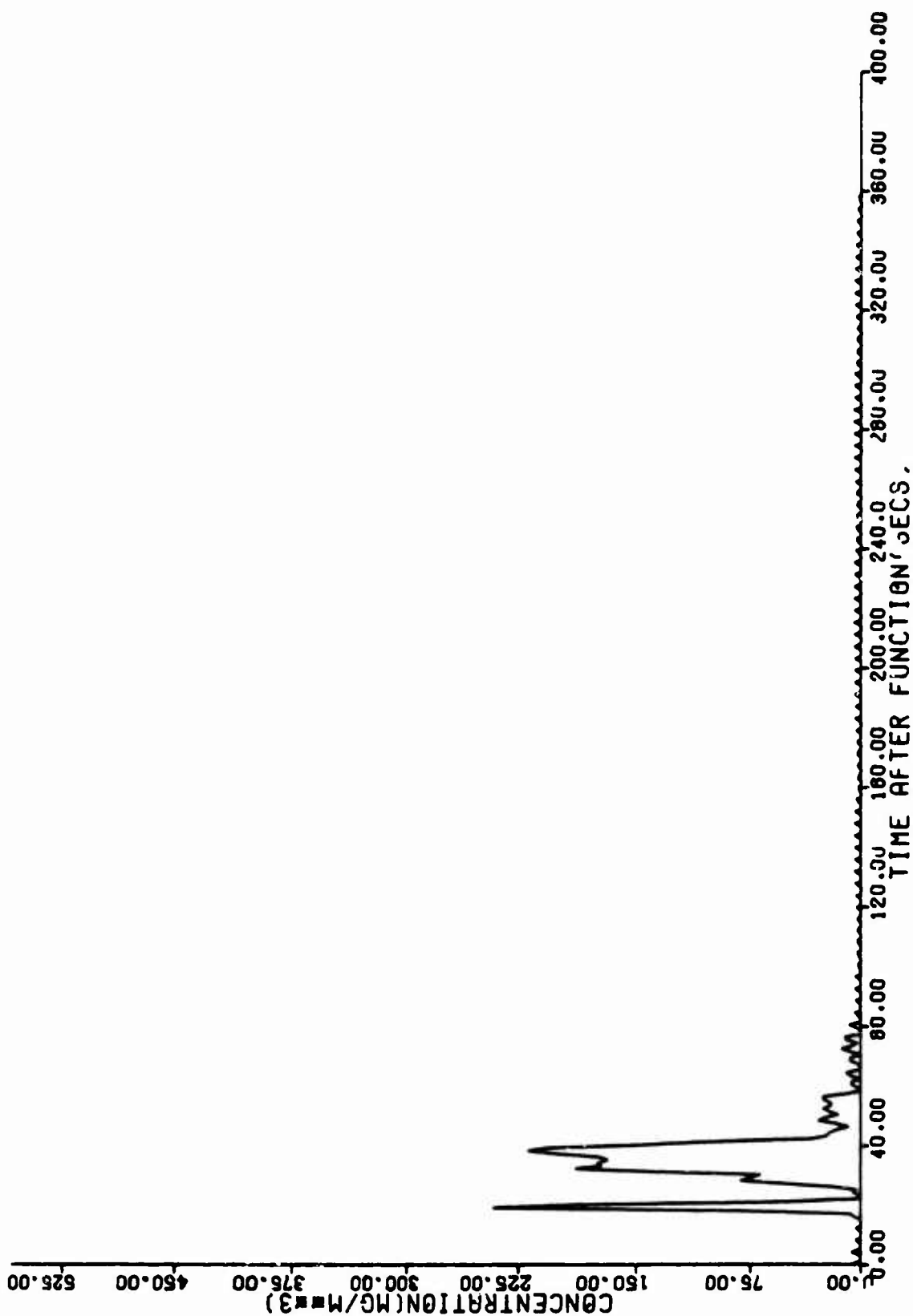
TRIAL 22 (CP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

AEROSOL PHOTOMETER #17, X=0.00, Y=228.00, Z=0.00



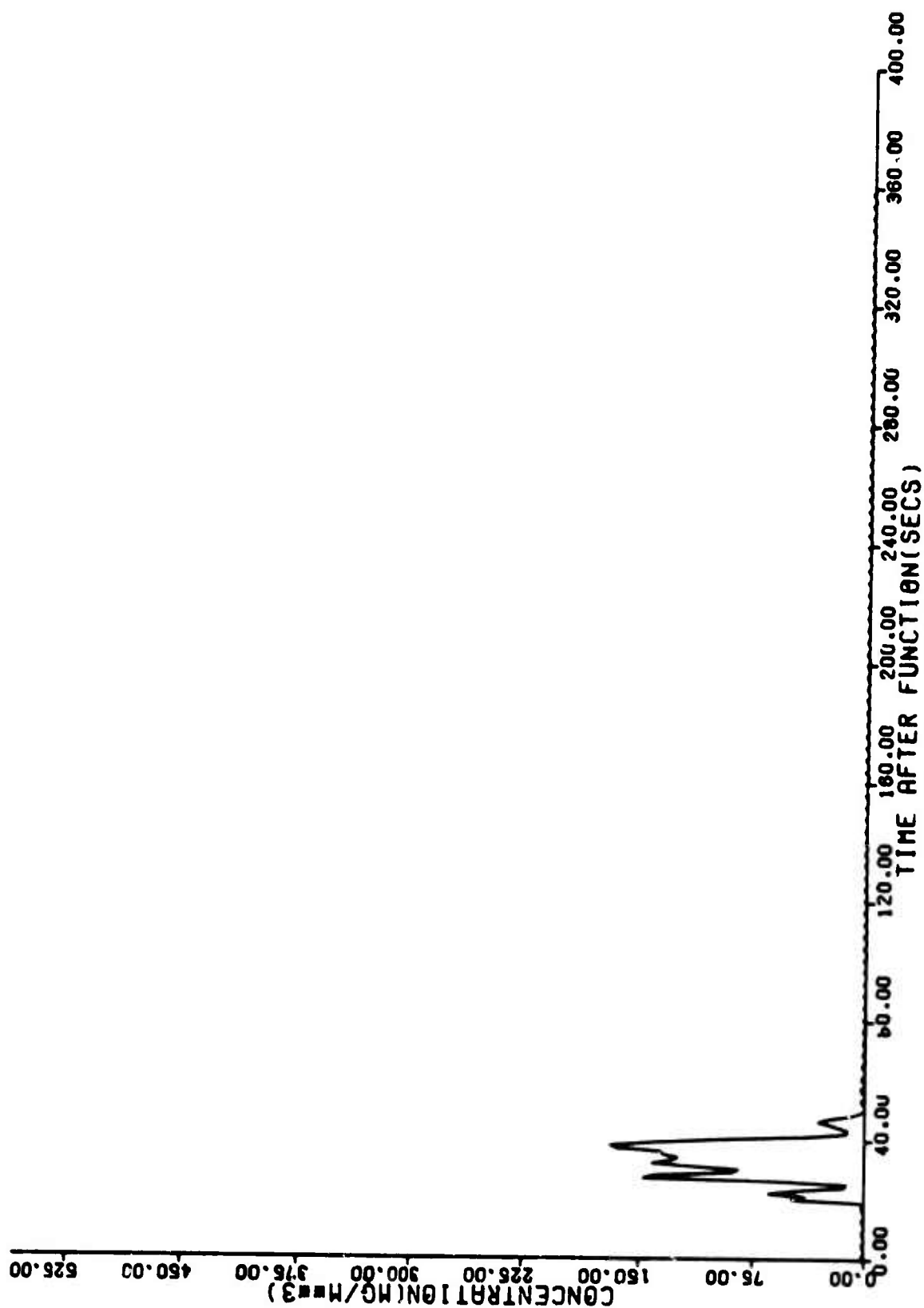
TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

AEROSOL PHOTOMETER #18, X=0.00, Y=246.00, Z=0.00



TRIAL 22 (DP-1002), 5 OCT 1977, 4:33:01, WP SMOKE

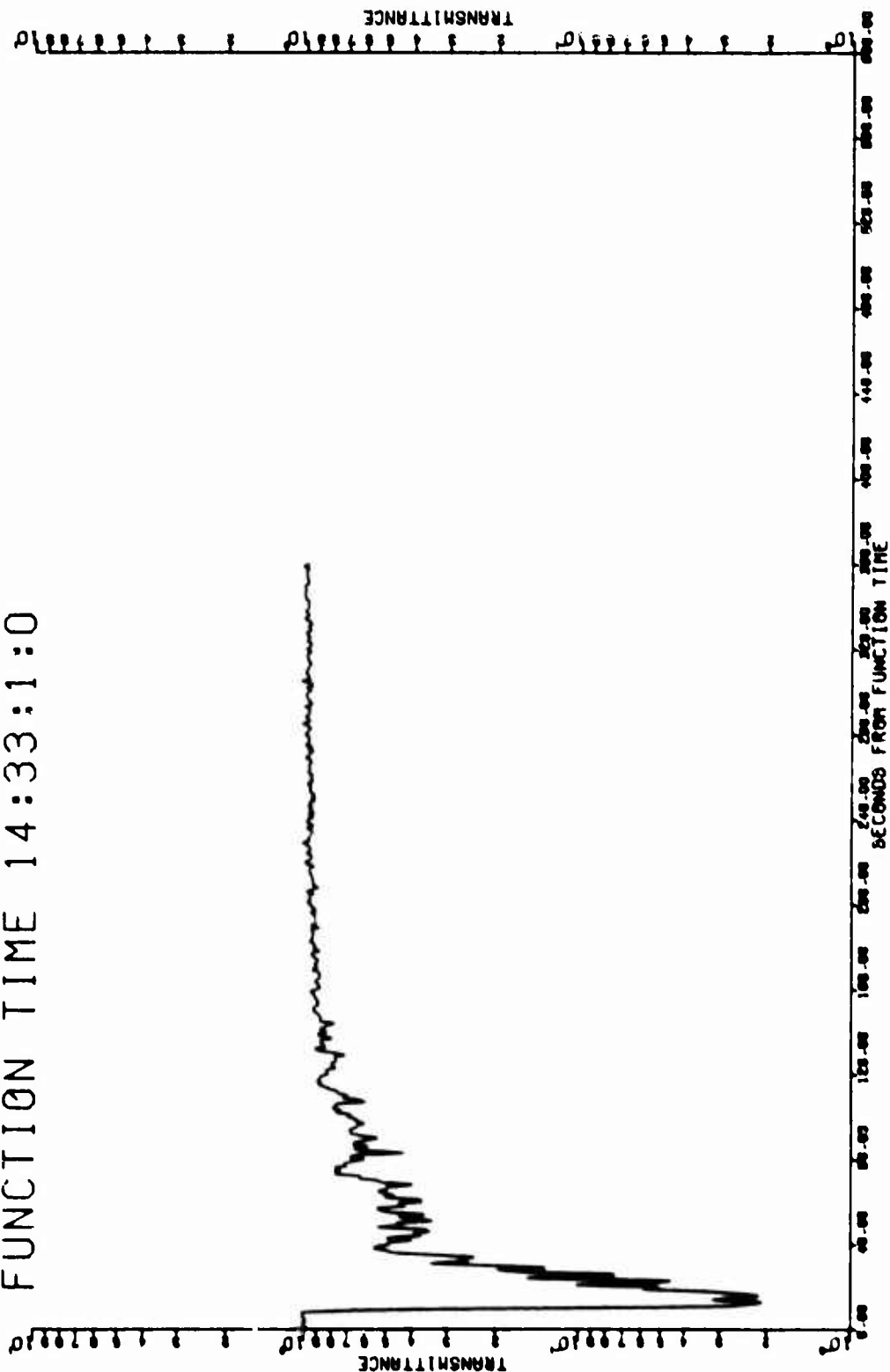
AEROSOL PHOTOMETER #19, X=0.00, Y=264.00, Z=0.00



TRIAL 22 (DP-1002), 5 OCT 1977, 14:33:01, WP SMOKE

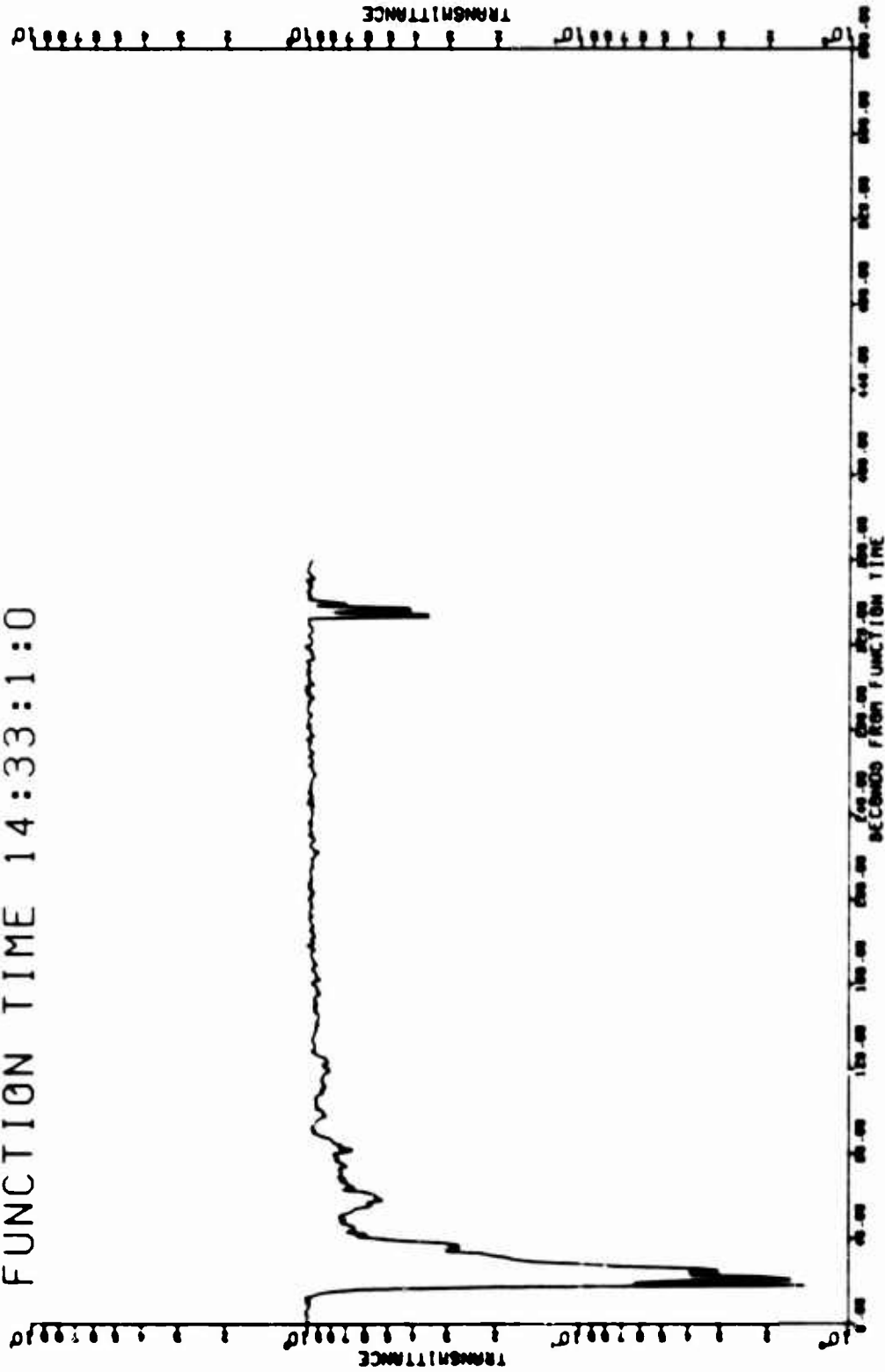
AEROSOL PHOTOMETER #20, X=0.00, Y=282.00, Z=0.00

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



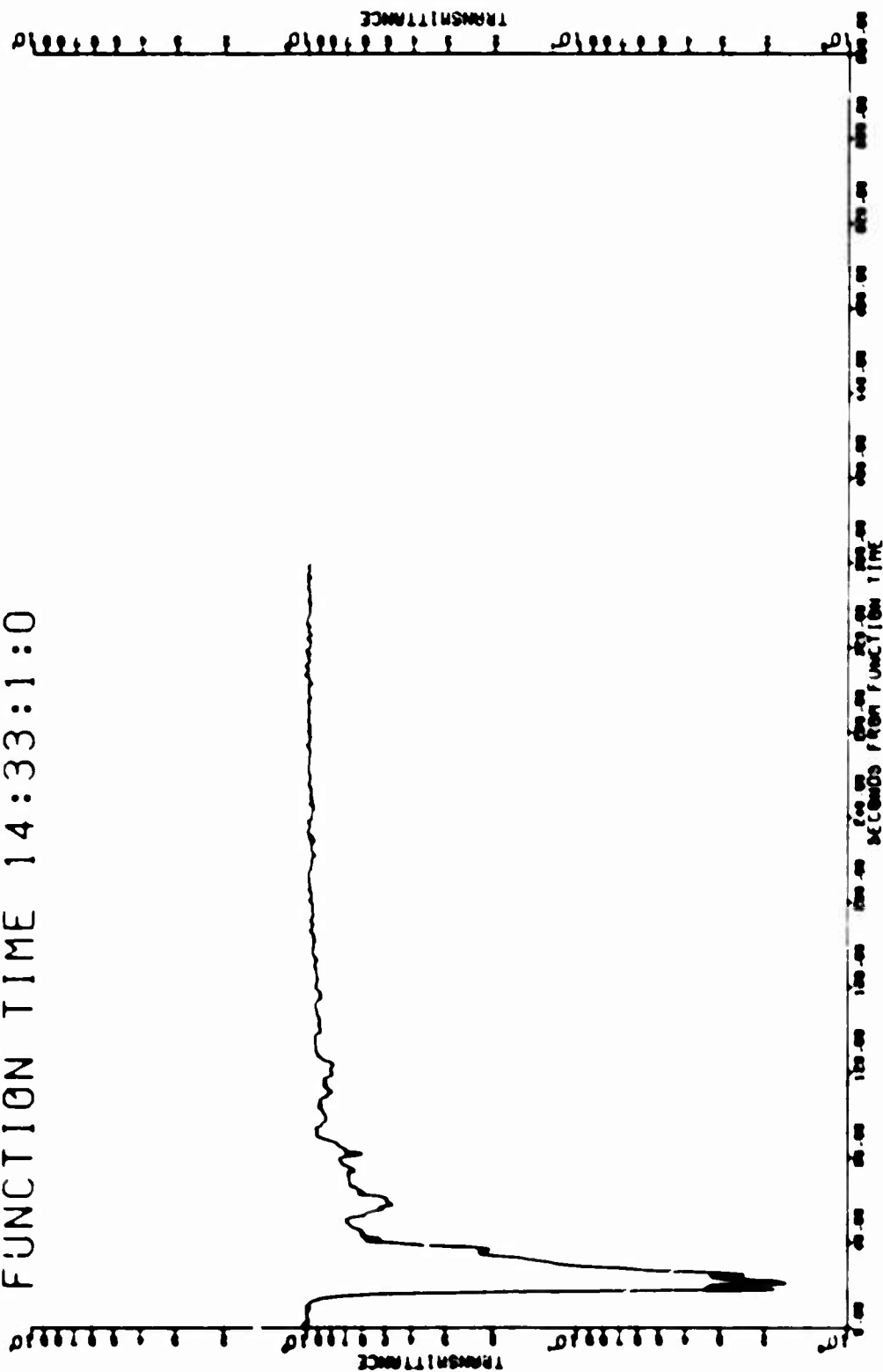
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



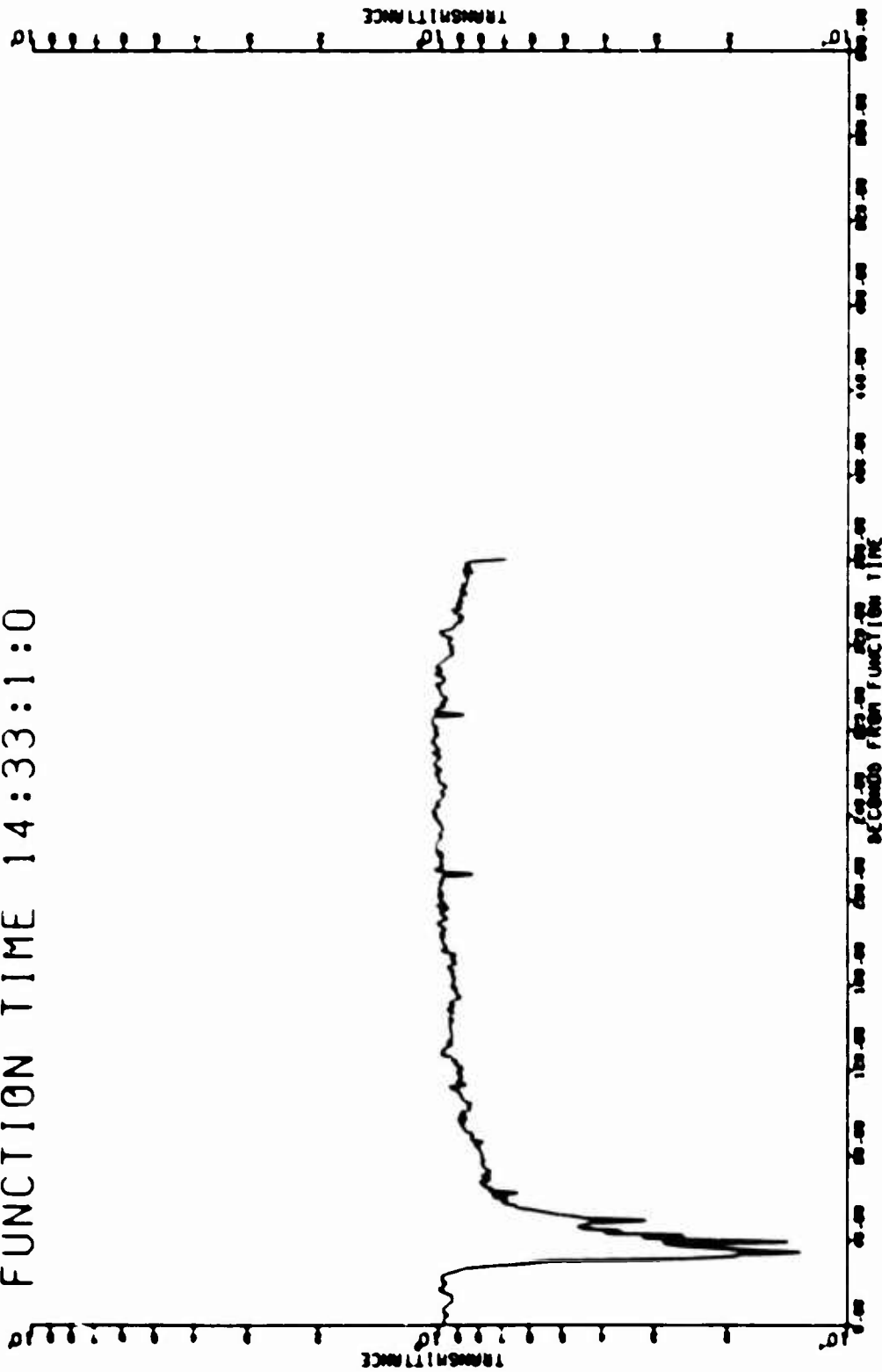
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



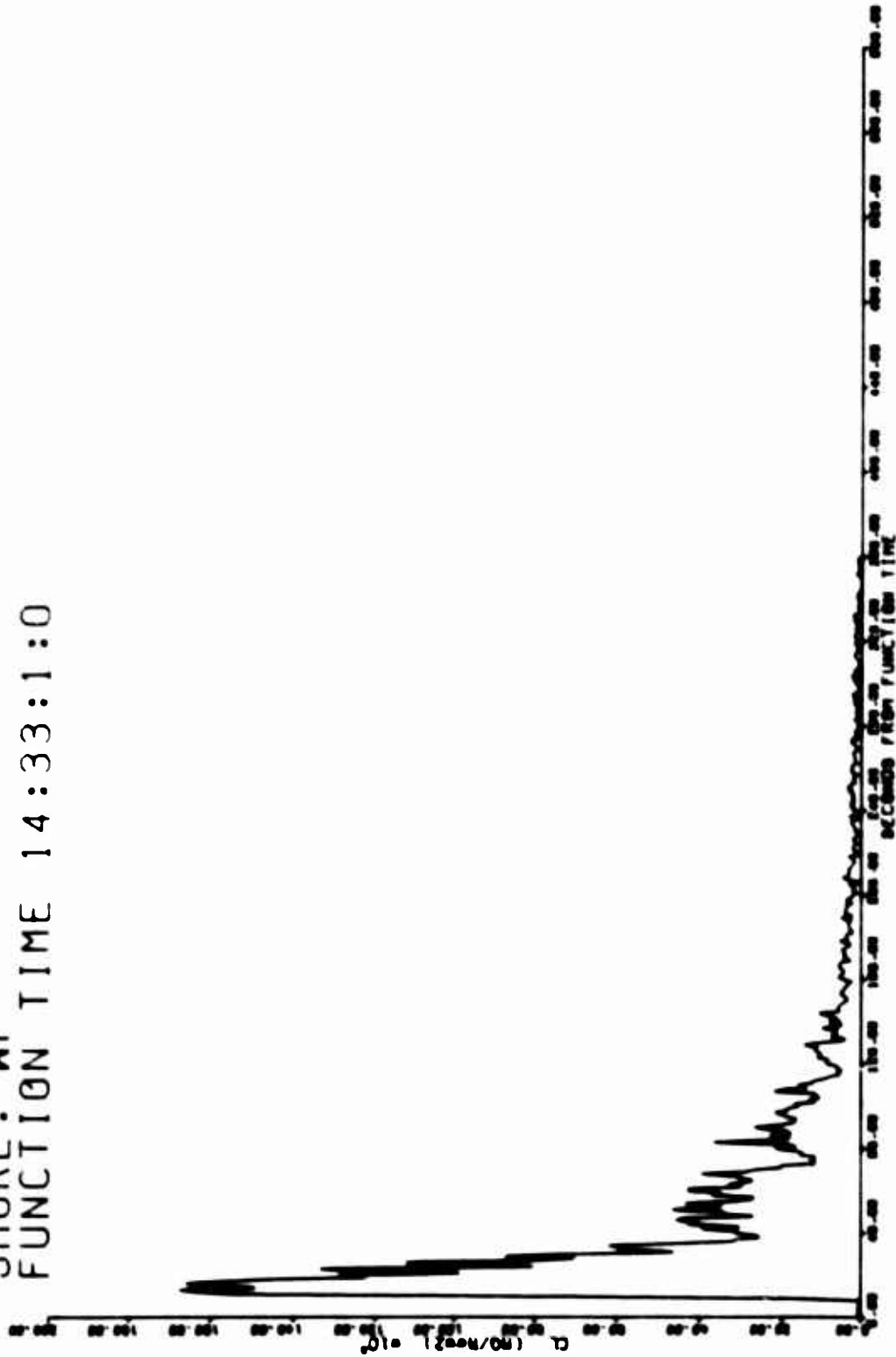
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:10



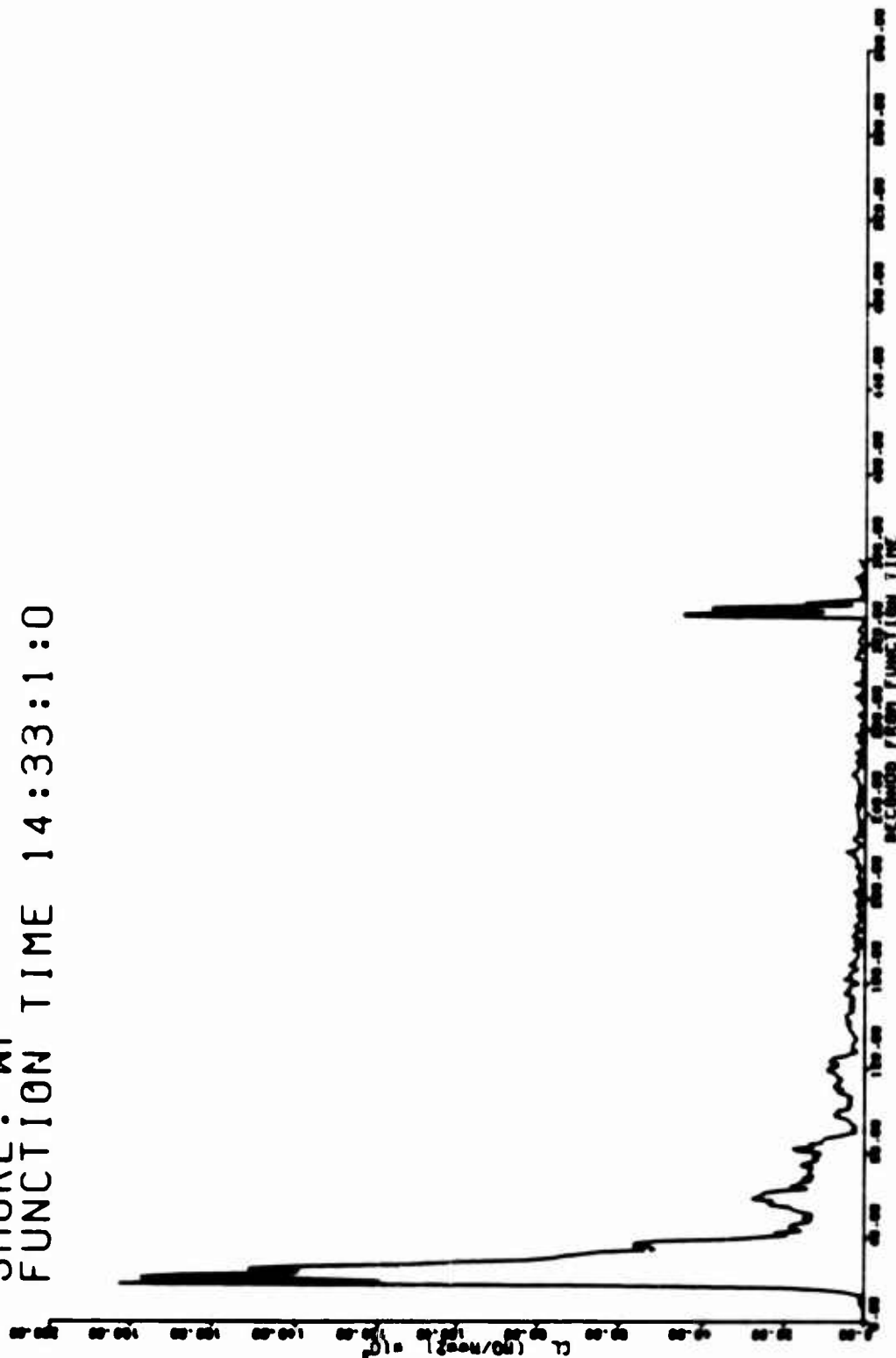
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0



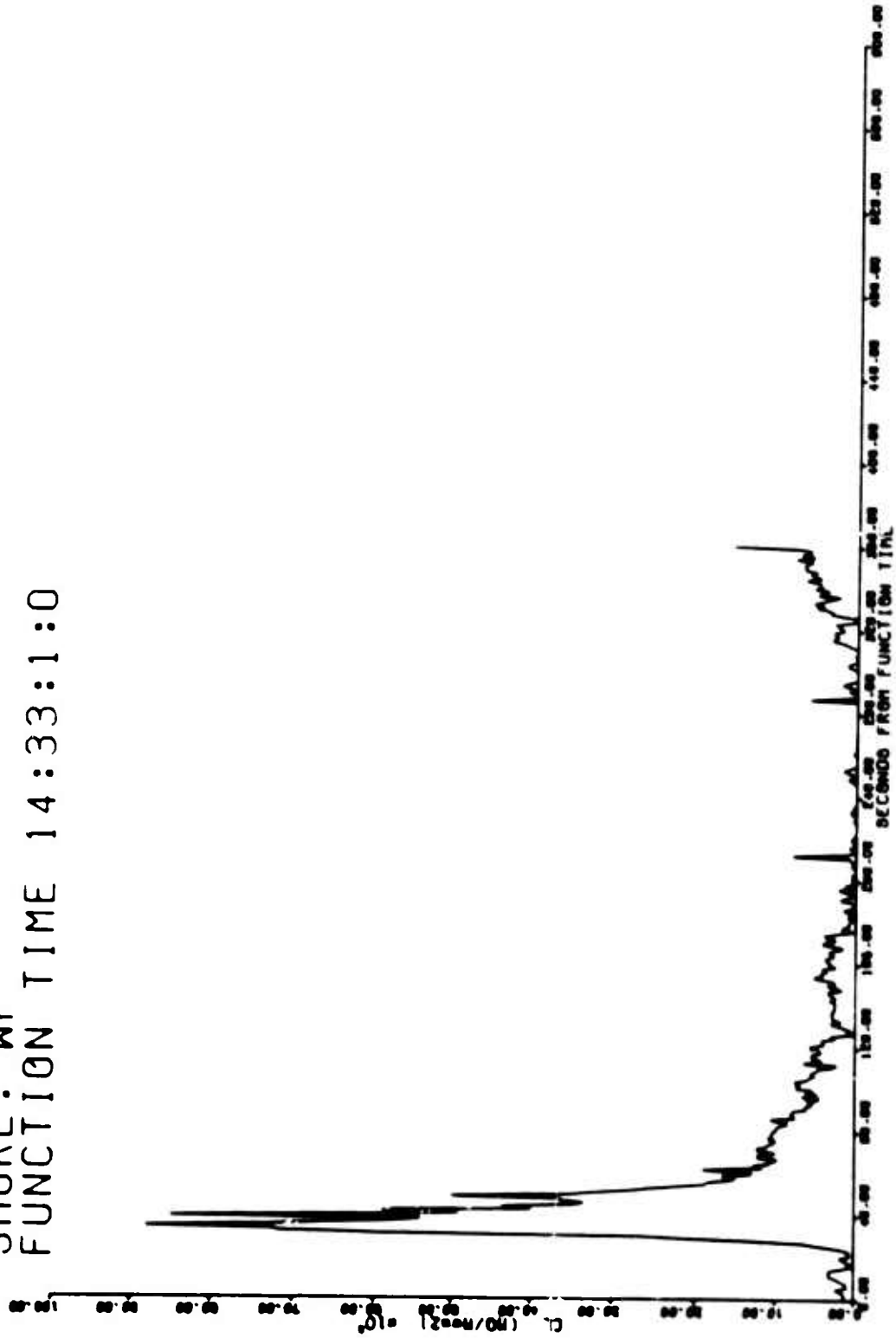
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



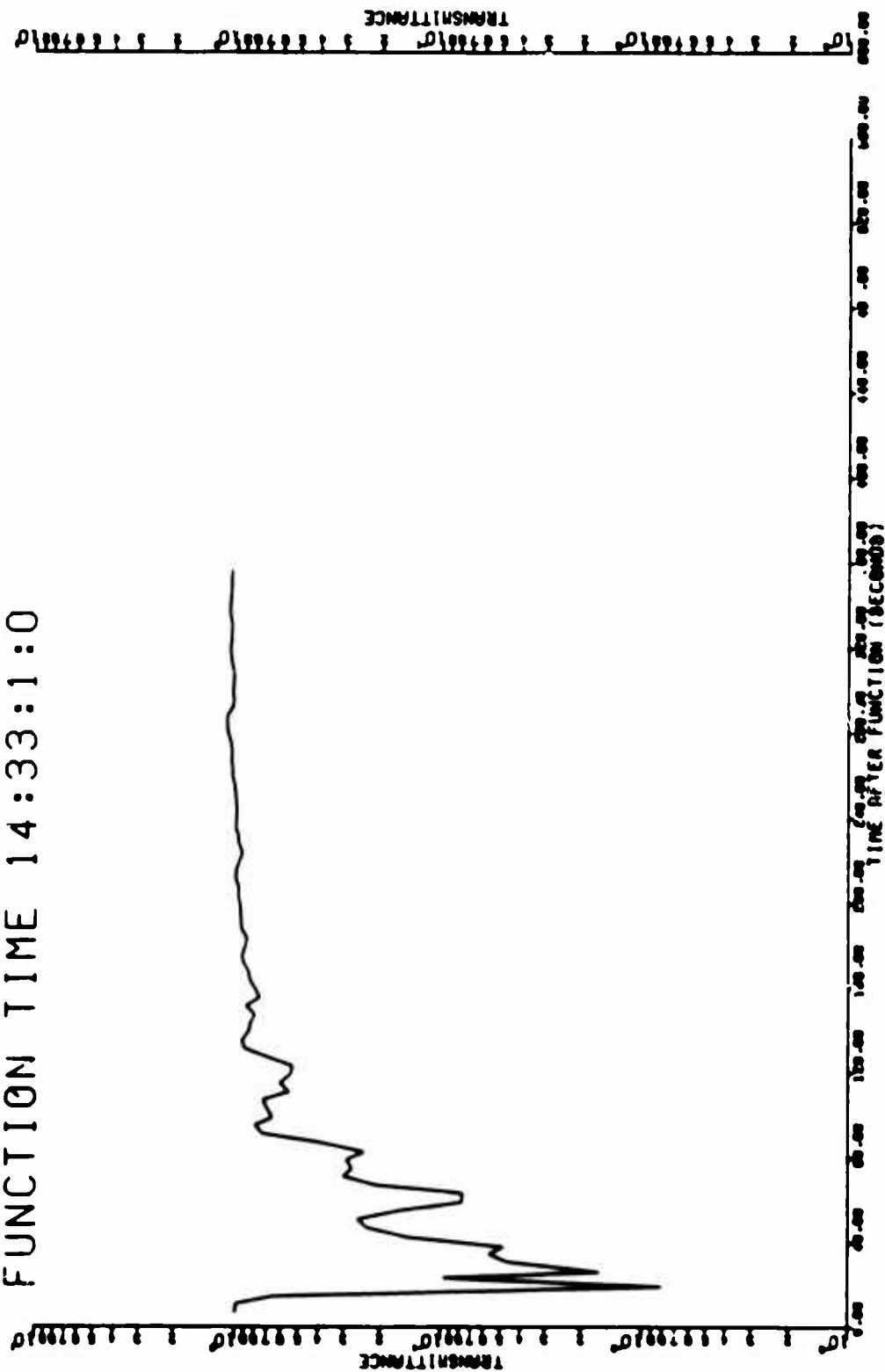
CL VALUES VERSUS TIME FOR ROW 0
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0



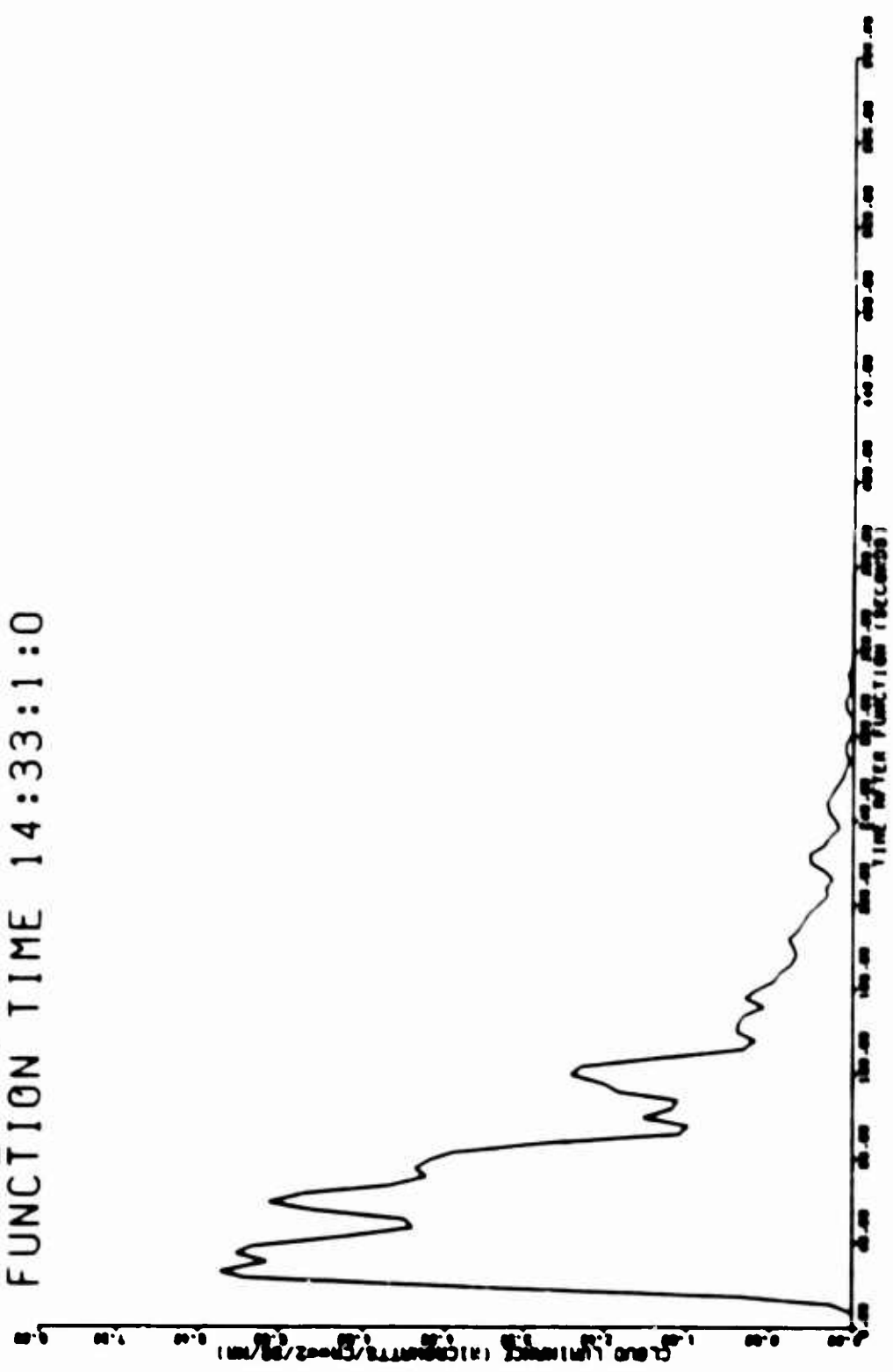
CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



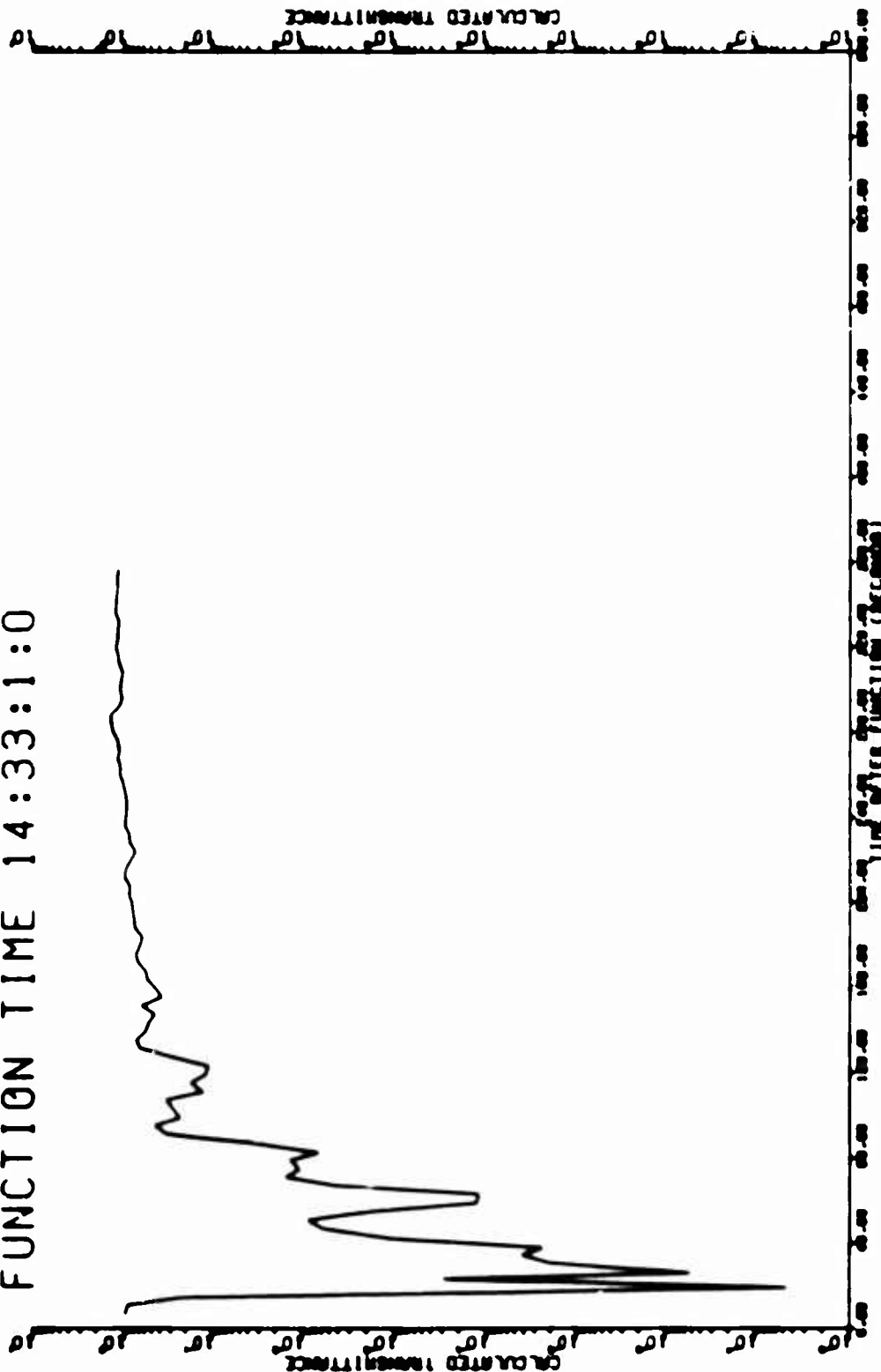
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0



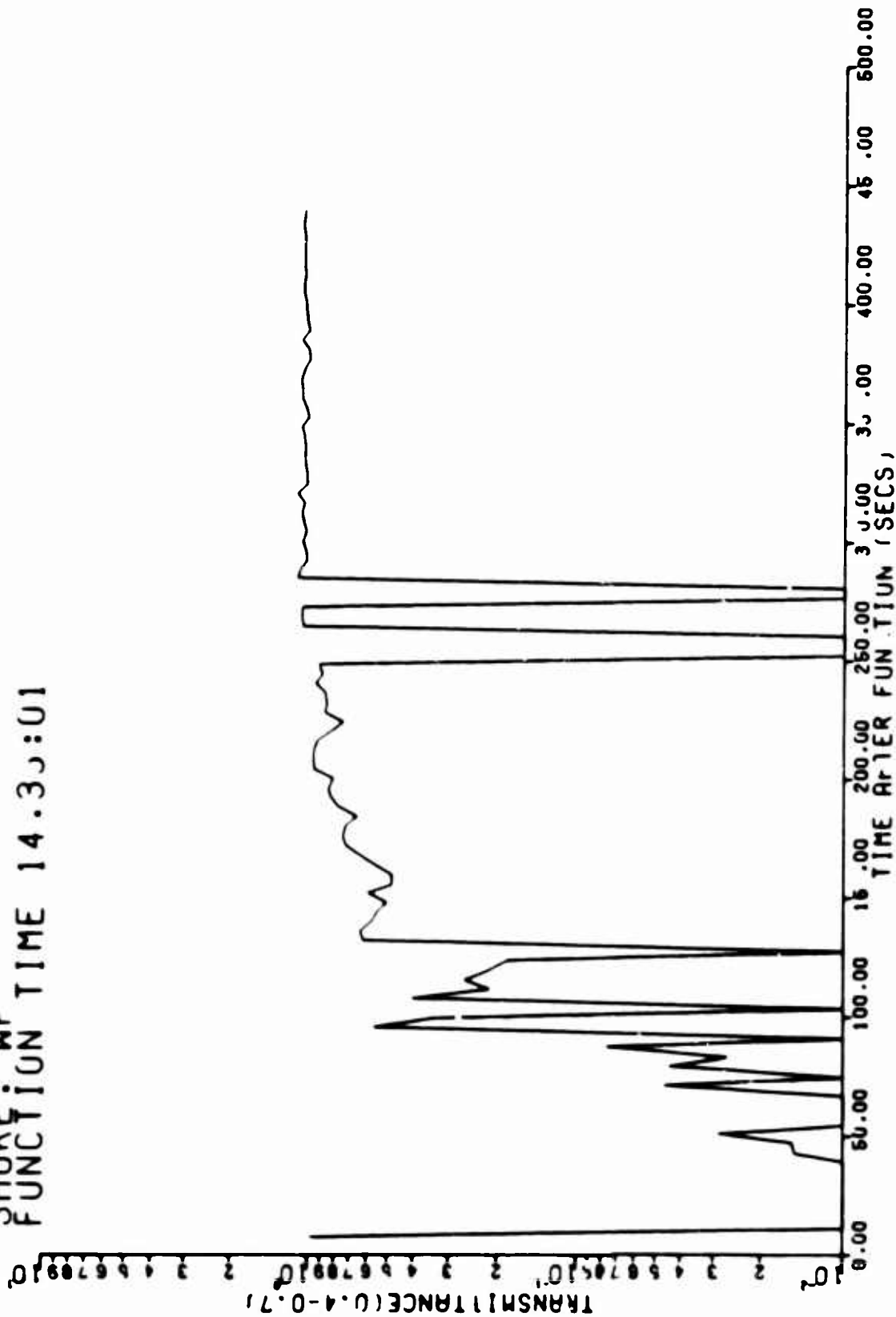
CLOUD LUMINANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0



CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

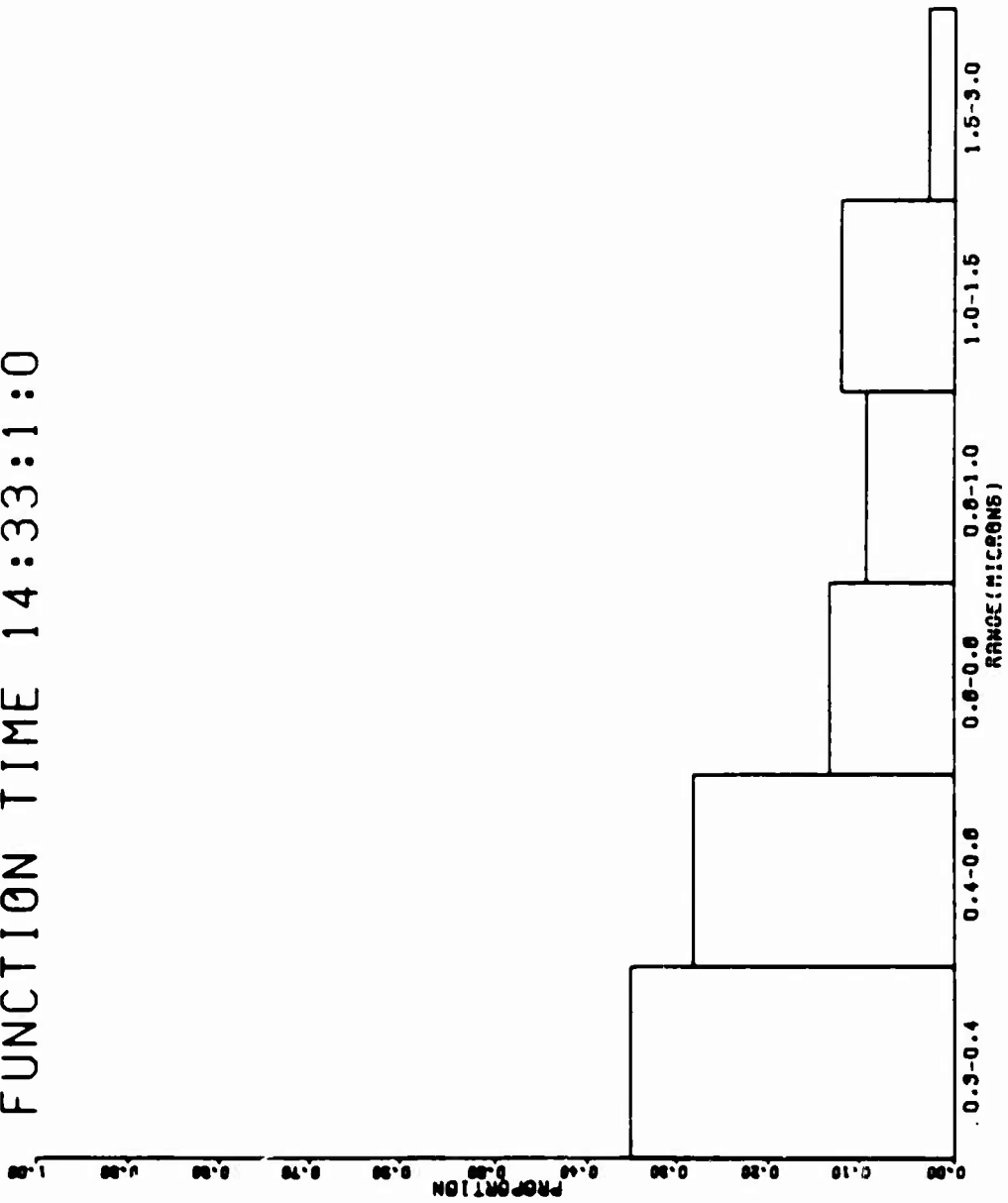
TRIAL 22 (DP-1002)
 DATE: 3 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14.30:01



82-51-1-8

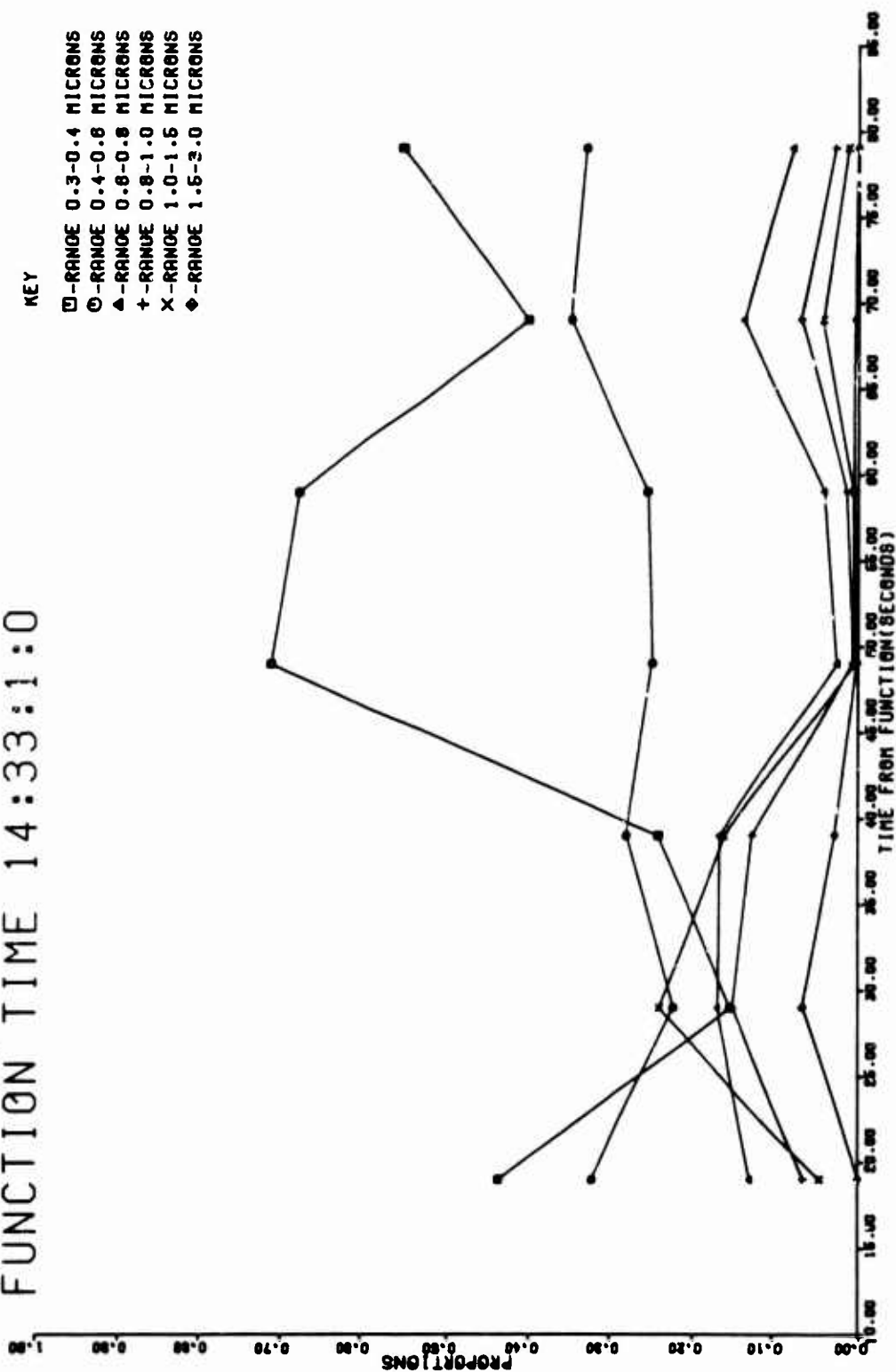
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
 4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #22 (DP1-002)
DATE: 5 OCT 1977
SMOKE: WP
FUNCTION TIME 14:33:1:0



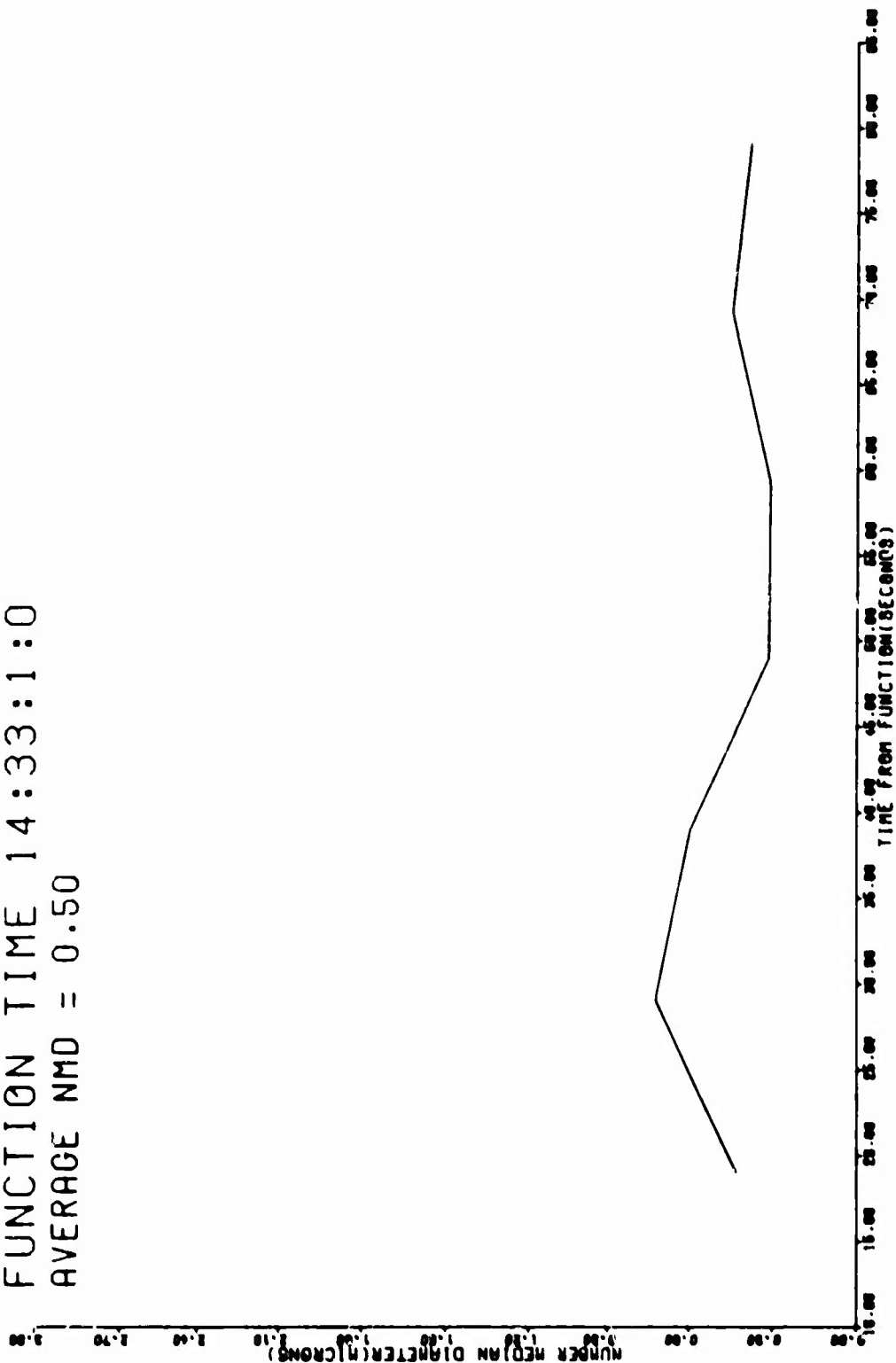
PARTICLE SIZE DISTRIBUTION BASED ON NUMBER

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #22 (DP1-002)
 DATE: 5 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:33:1:0
 AVERAGE NMD = 0.50



AVERAGE NMD VS A FUNCTION OF TIME

APPENDIX B-I-16

TRIAL DP1-002-T-23 (WP SMOKE) 6 OCT 1977

SUMMARY OF TEST DATA	B-I-16-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-16-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-16-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-16-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-16-15
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-16-16
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-16-17
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.093 μ m) ALONG ROW Q	B-I-16-18
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-16-19
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-16-20
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-16-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-16-22
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-16-23
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-16-24
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-16-25

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 ND

FIGURE: PARTICLE SIZE DISTRIBUTION B-1-16-26

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME B-1-16-27

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME B-1-16-28

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #23

Date: 06 Oct 77

Time: 1310 MDT

Wind Direction (Transport) (degrees) (4m)	318
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.3
Temperature at 2-meters, Trial Time (T, °C)	13.7
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	10.2
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	3.4
Temperature Gradient, 0.5-8m (ΔT , °C)	MSG
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.23
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	54.0
Solar Azimuth (deg)	176.3
Solar Altitude (deg)	44.5
Air Density - ρ (kg m ⁻³)	1.045
Solar Radiation (Langleys per minute)	0.181
Barometric Pressure (millibars)	867.6
Visibility (km)	16
Reflectivity, OD Target	ND
Haze (footlamberts)	ND
Brightness, Background (footlamberts)	800
Brightness, White Target (footlamberts)	ND
Brightness, OD Target	260
Percent Opaque Cloud Cover	10

Munitions/Submunitions Used (WP, 155mm) 6

Number of Munitions/Submunitions Functioned 6

Particle Size Range (micron)

(0.3 - 0.4)16

(0.4 - 0.6)11

(0.6 - 0.8)29

(0.8 - 1.0)21

(1.0 - 1.5)01

(1.5 - 3.0)22

$\log_{10} \text{NMD}$ -.11867

$\sigma \log_{10} \text{NMD}$ 26962

NMD76

MMD 1.12

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1310:00*	6	29	4
1310:10	106	53	18
1310:20	165	53	20
1310:30	375	33	21
1310:40	Cloud aloft		

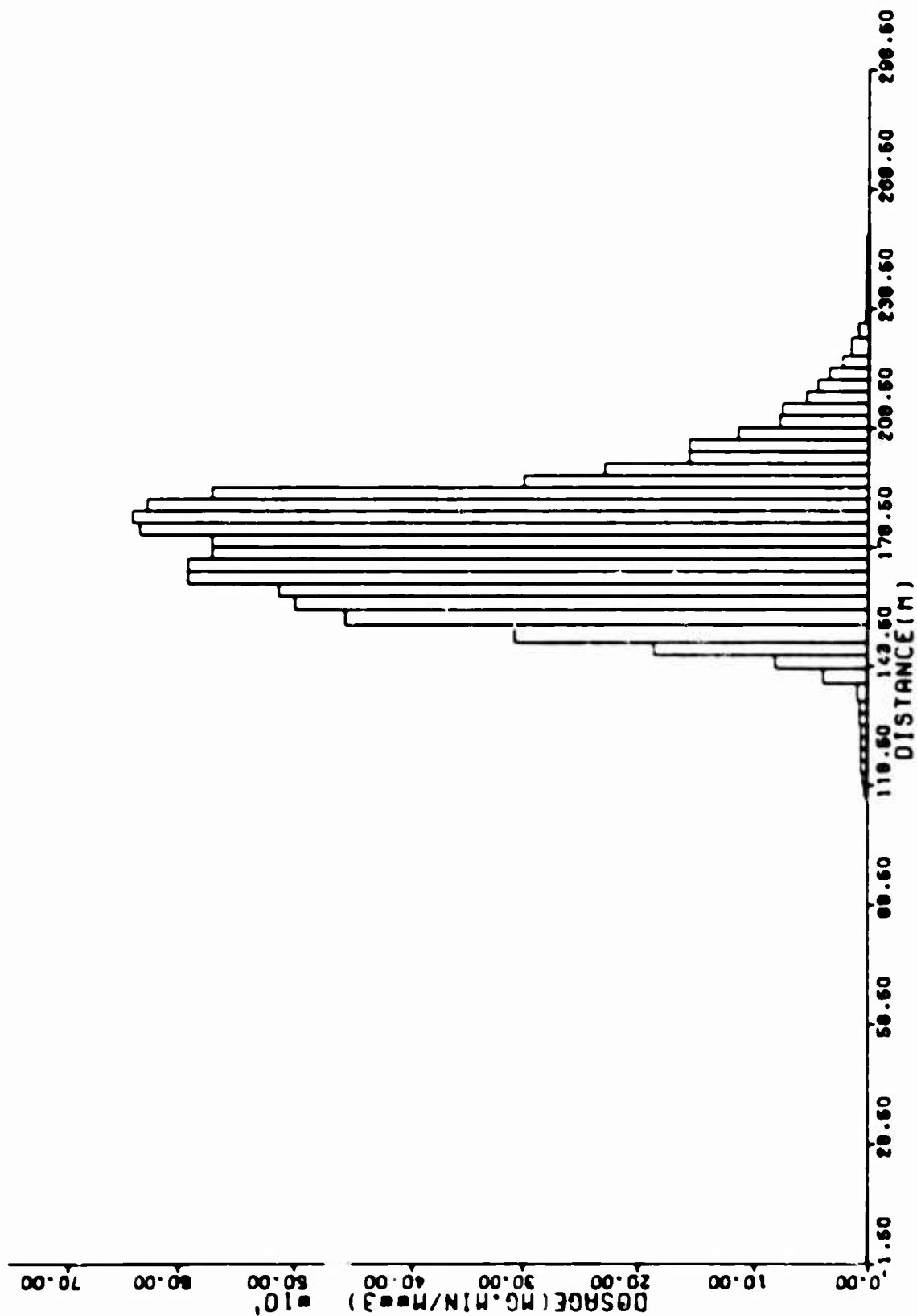
*Not all cartridges were ignited during this picture frame.

SKY BRIGHTNESS

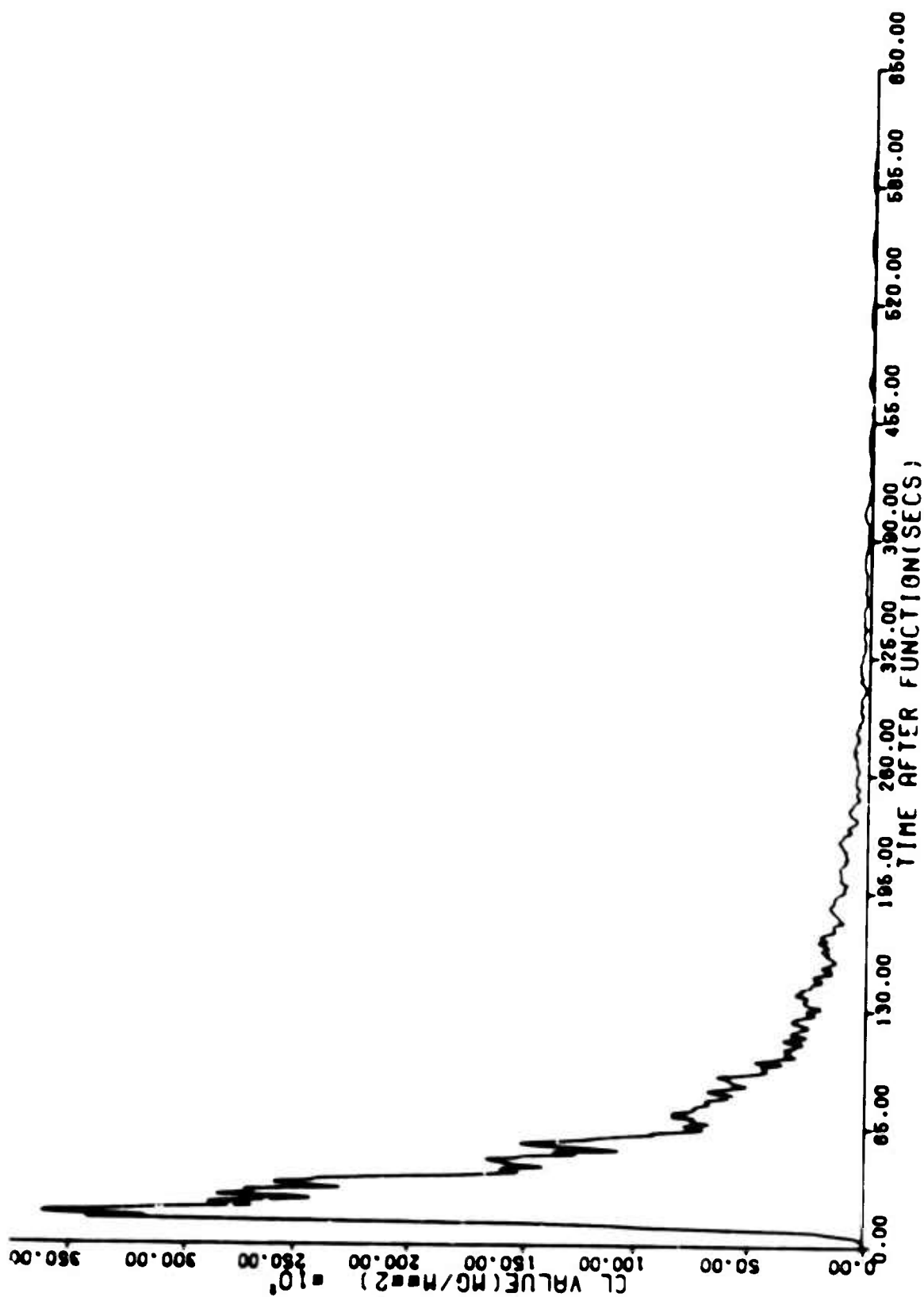
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	504
5	1140
10	1300
15	1140
20	1140
25	1640
30	1640
35	1640
40	1300
45	1300

Viewing azimuth 240° except 255° at 0 degrees elevation

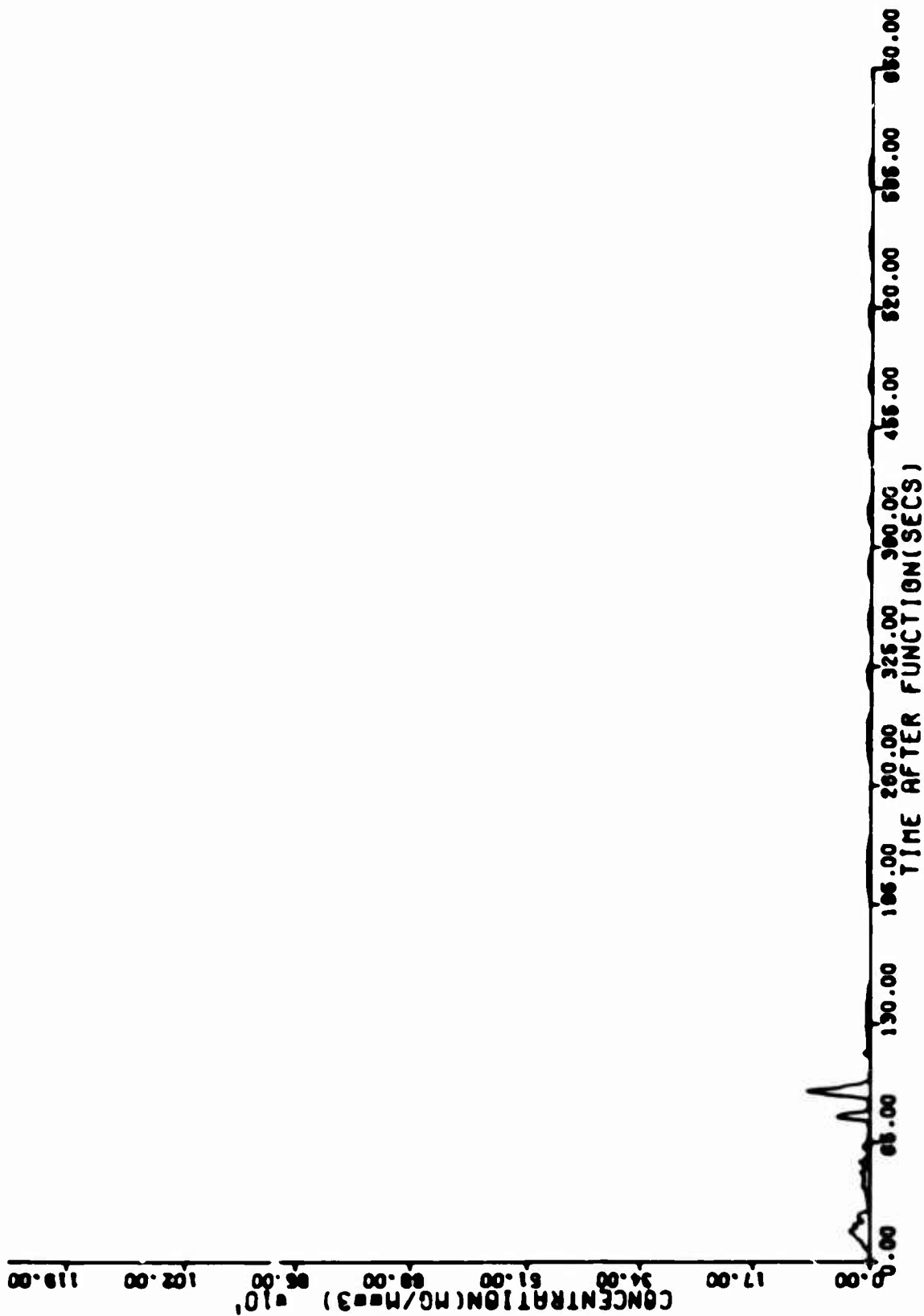


TRIAL 23 (DP-1002). 6 OCT 1977. 13:10:00. WP SMOKE



TRIAL 23 (DP-1002). 6 OCT 1977. 13:10:00. WP SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



TRIAL 23 (DP-1002), 6 OCT 1977, 13:10:00, WP SMOKE

AEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00

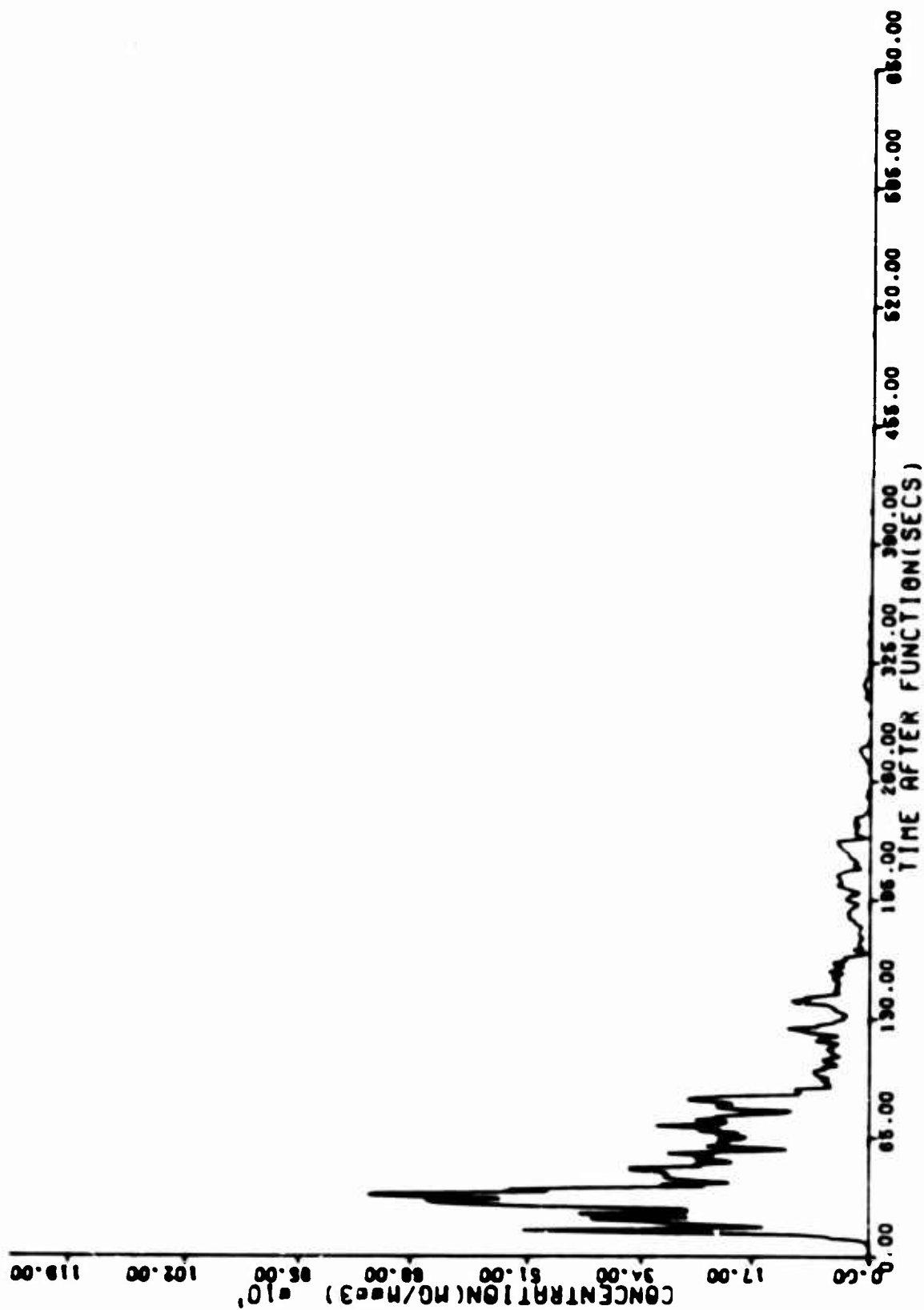
CONCENTRATION(MG/H=3) *10¹

119.00 102.00 85.00 68.00 51.00 34.00 17.00 0.00



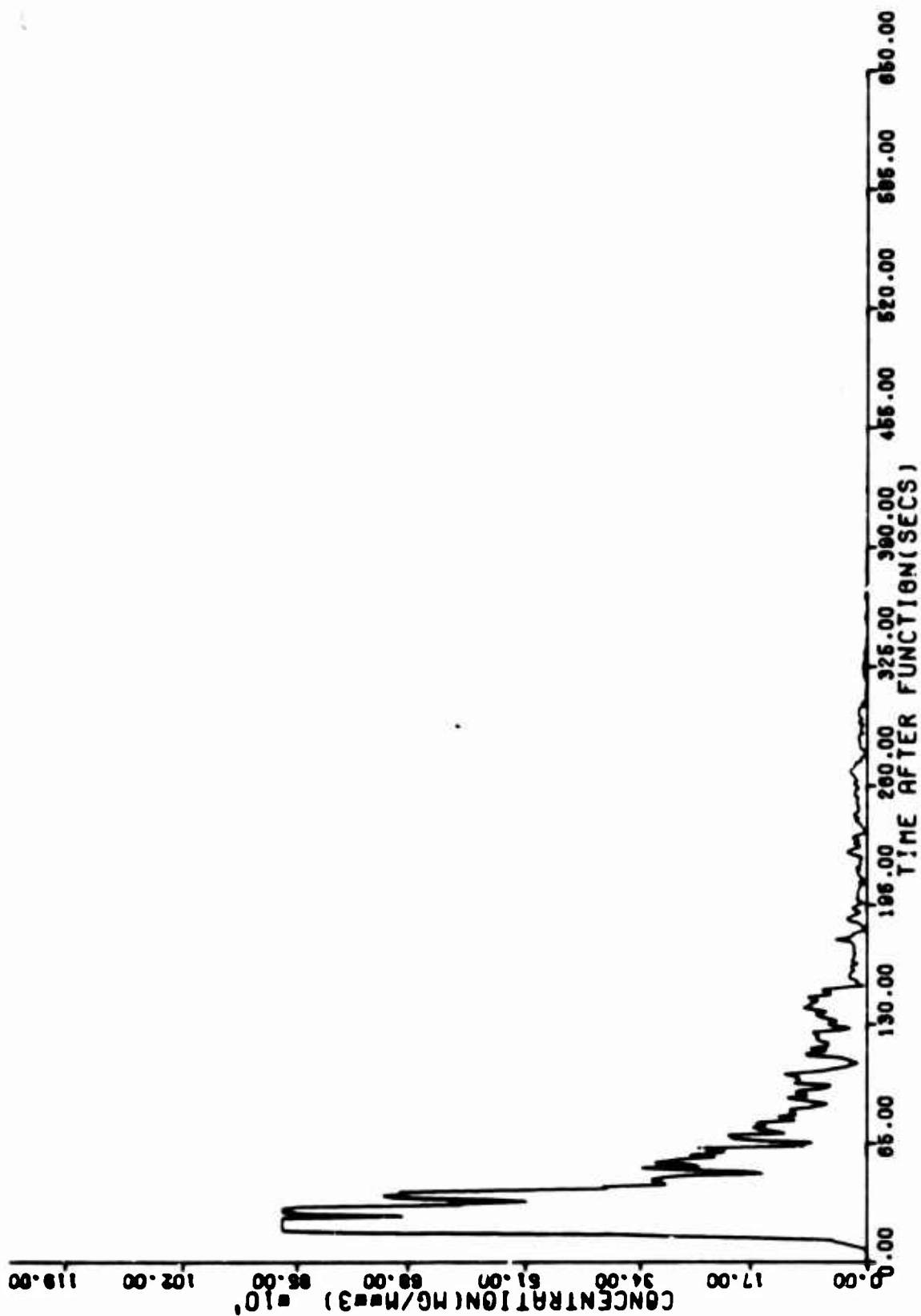
TRIAL 23 (DP-1002). 6 OCT 1977. 13:10:00. WP SMOKE

AEROSOL PHOTOMETER #11. X=0.00. Y=156.00. Z=0.00



TRIAL 23 (DP-1002). 6 OCT 1977. 13:10:00. WP SMOKE

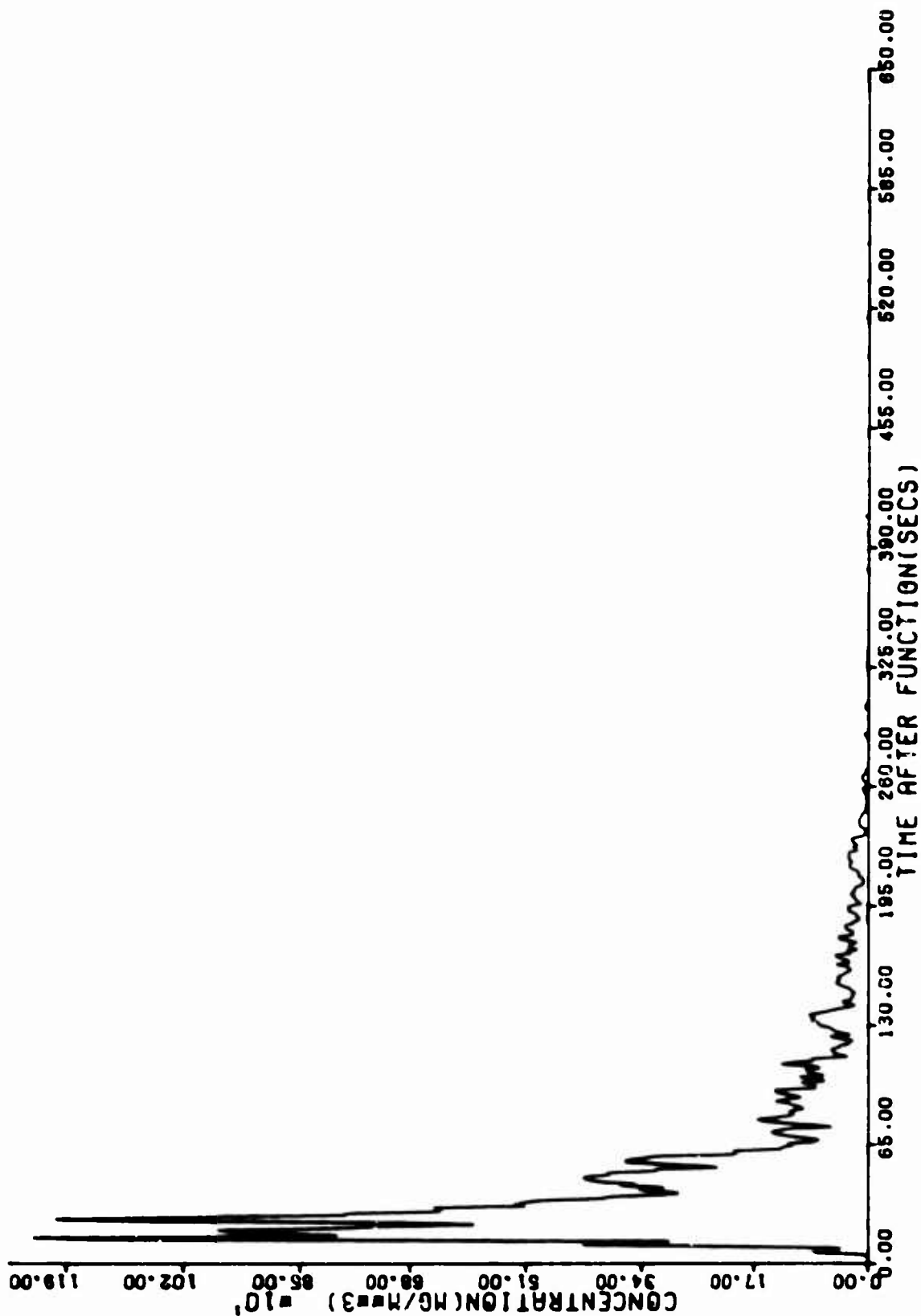
AEROSOL PHOTOMETER #12. X=0.00. Y=165.00. Z=0.00



TRIAL 23 (DP-1002), 6 OCT 1977, 13:10:00, WP SMOKE

AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00

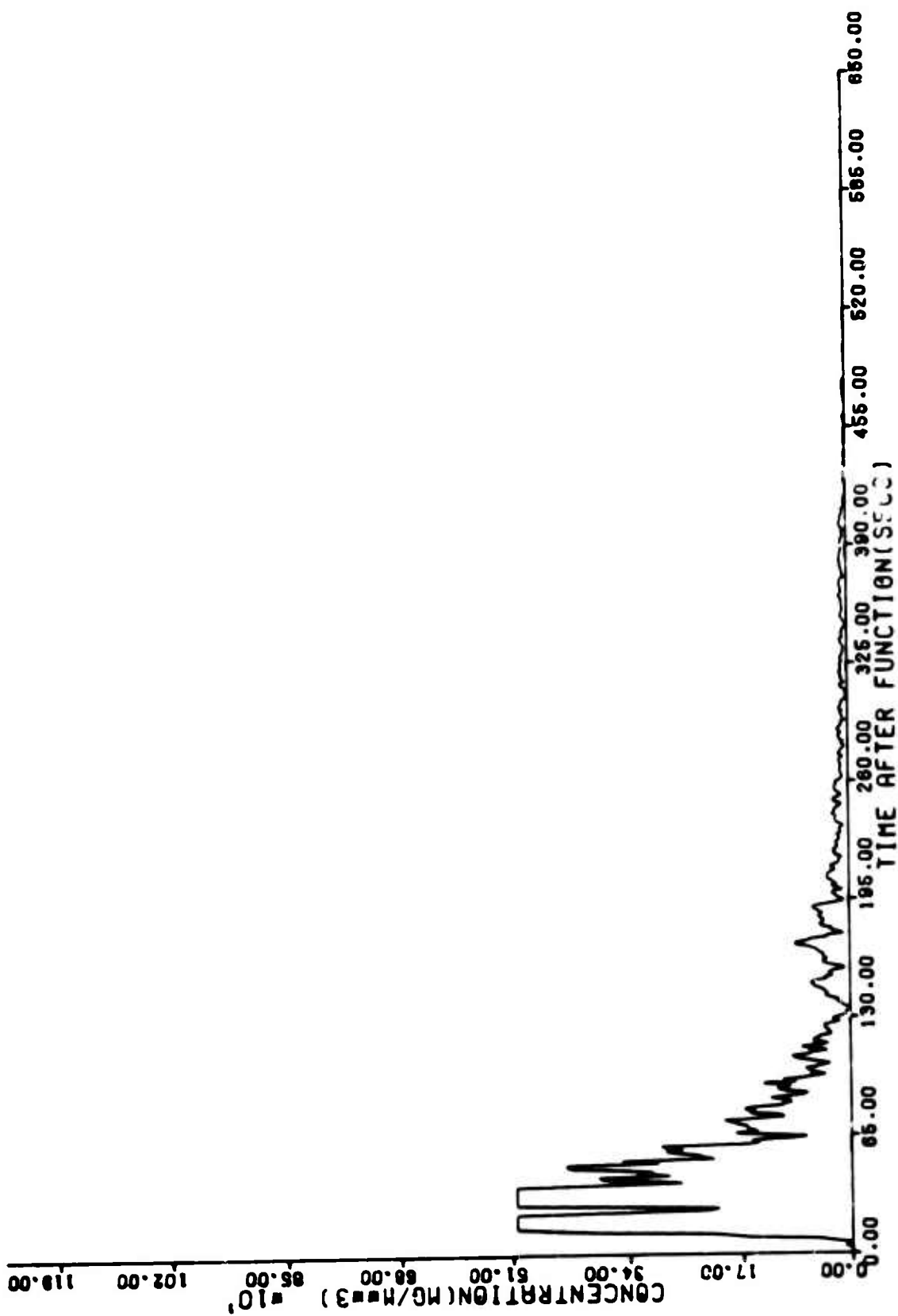
B-1-16-12



TRIAL 23 (DP-1002), 6 OCT 1977, 13:10:00, WP SMOKE

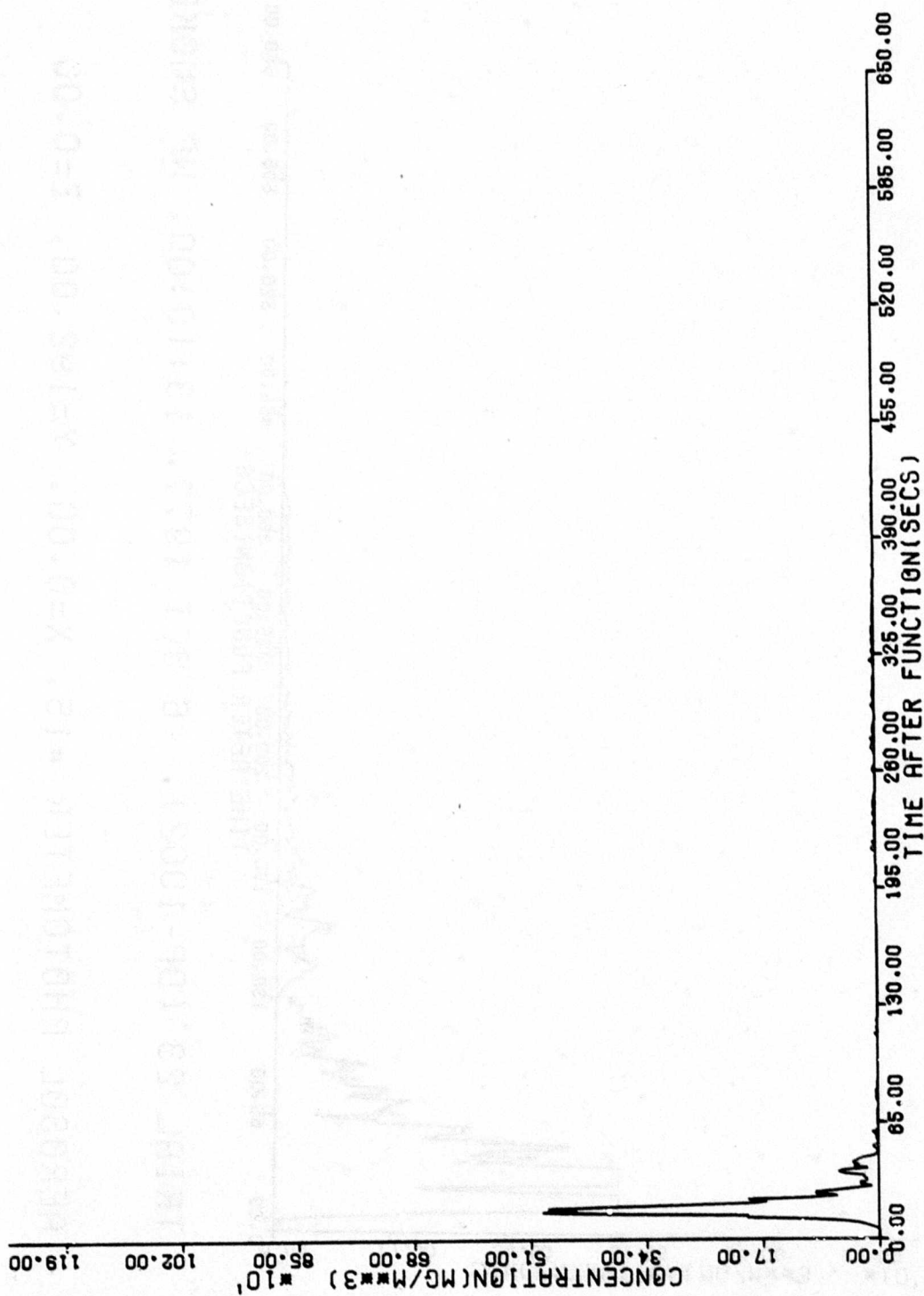
AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00

B-1-16-13



TRIAL 23 (DP-1002), 6 OCT 1977, 13:10:00, WP SMOKE

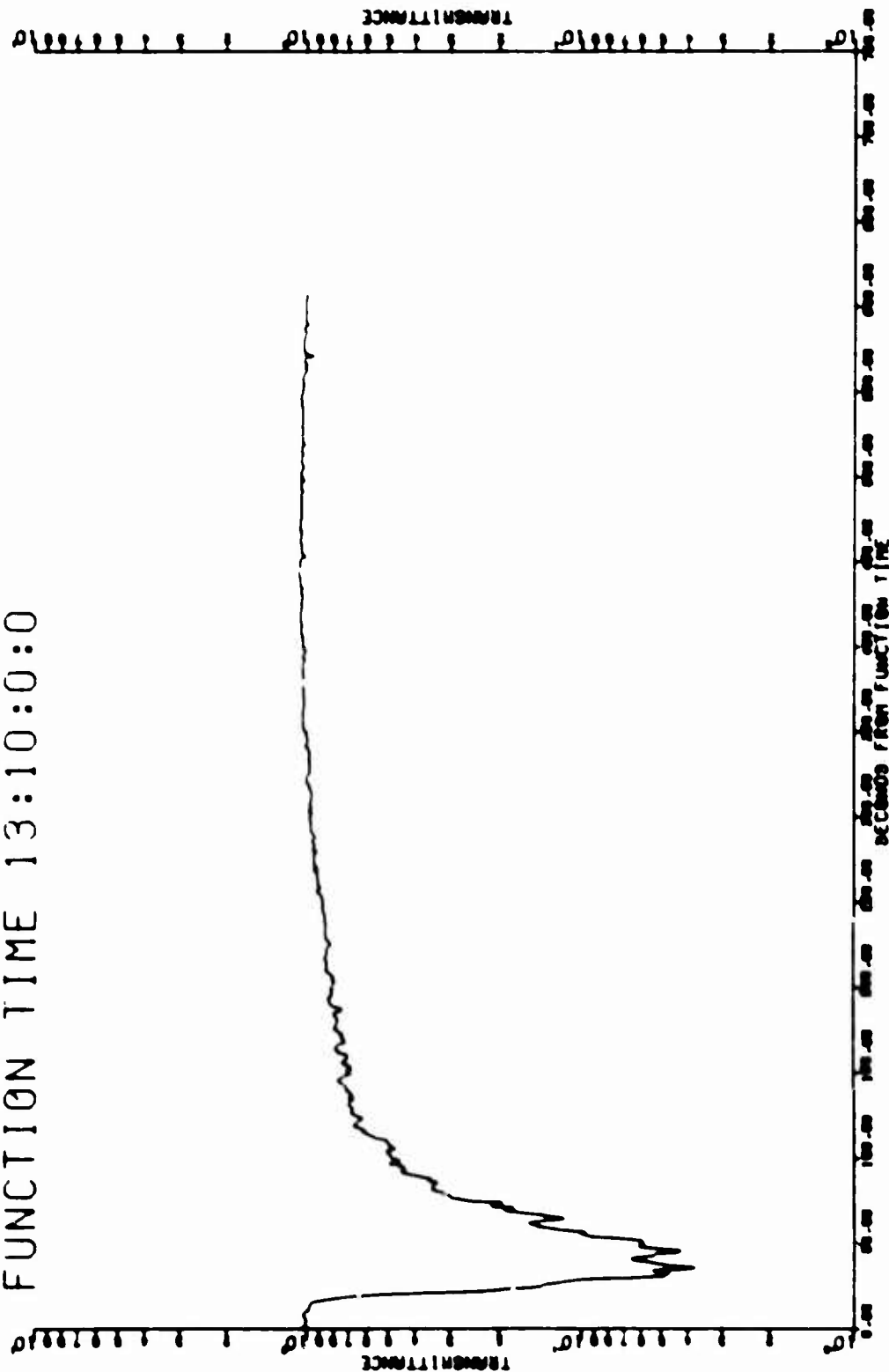
AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 23 (DP-1002), 6 OCT 1977, 13:10:00, WP SMOKE

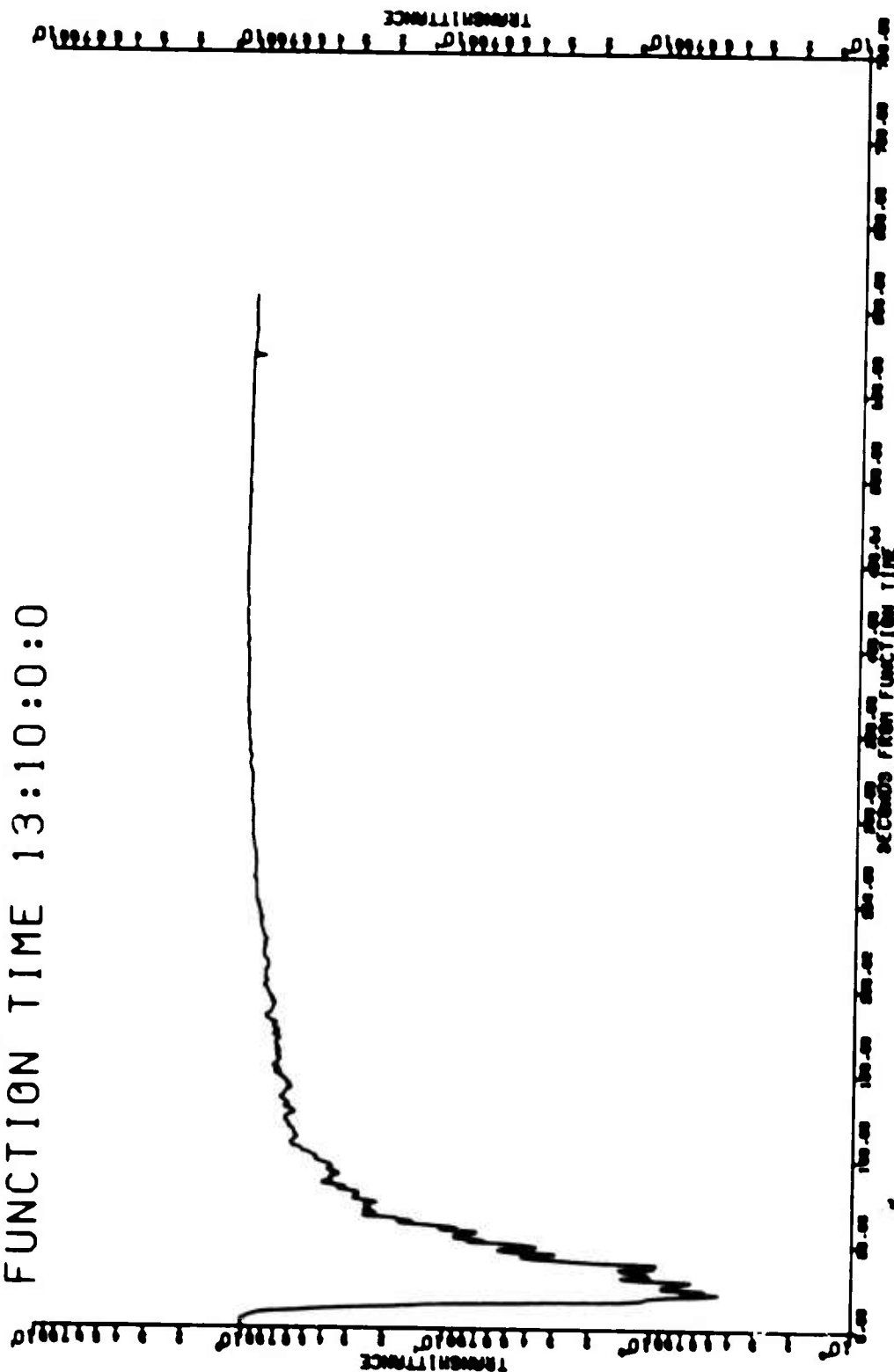
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:0:0



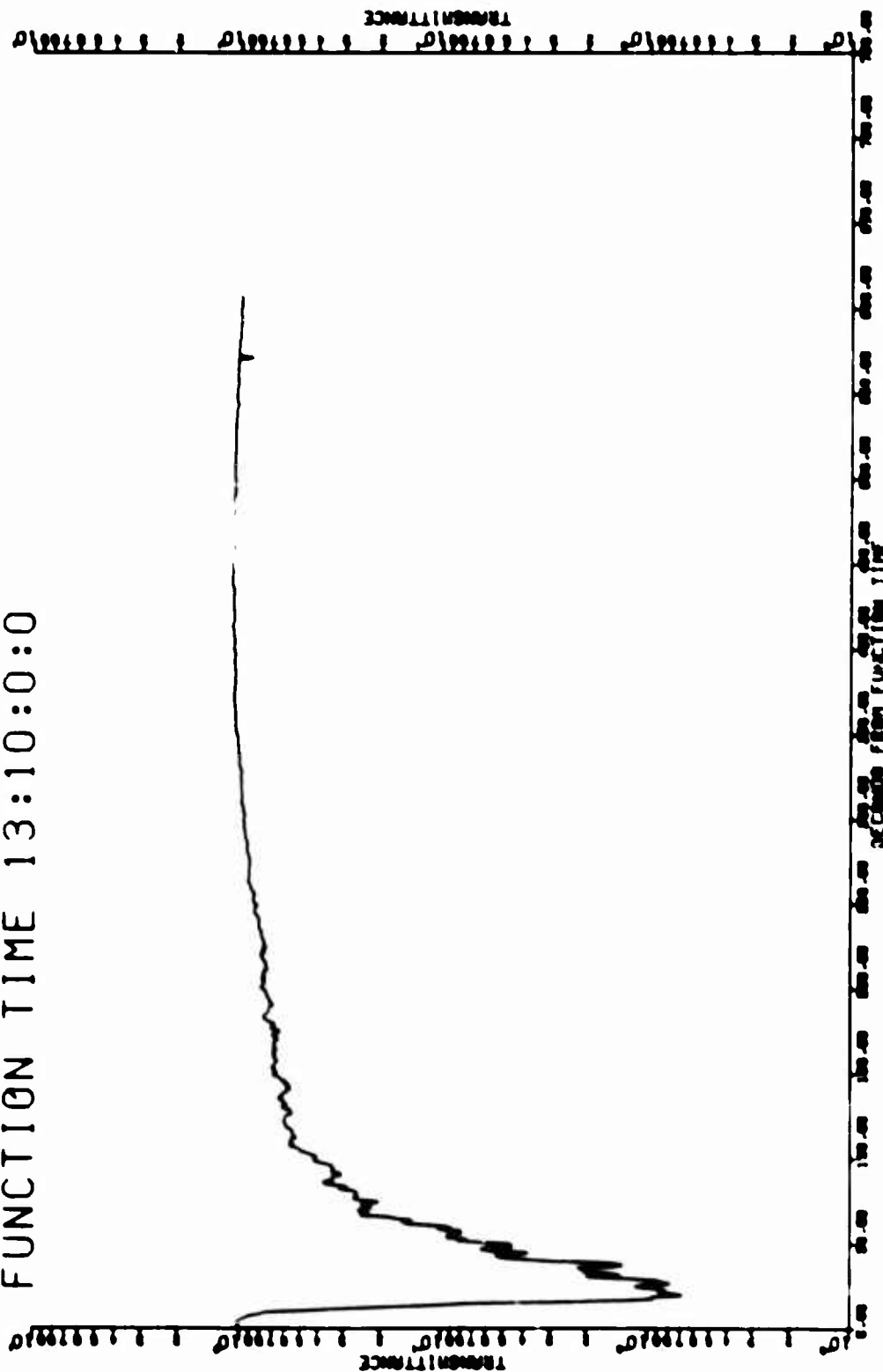
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:00



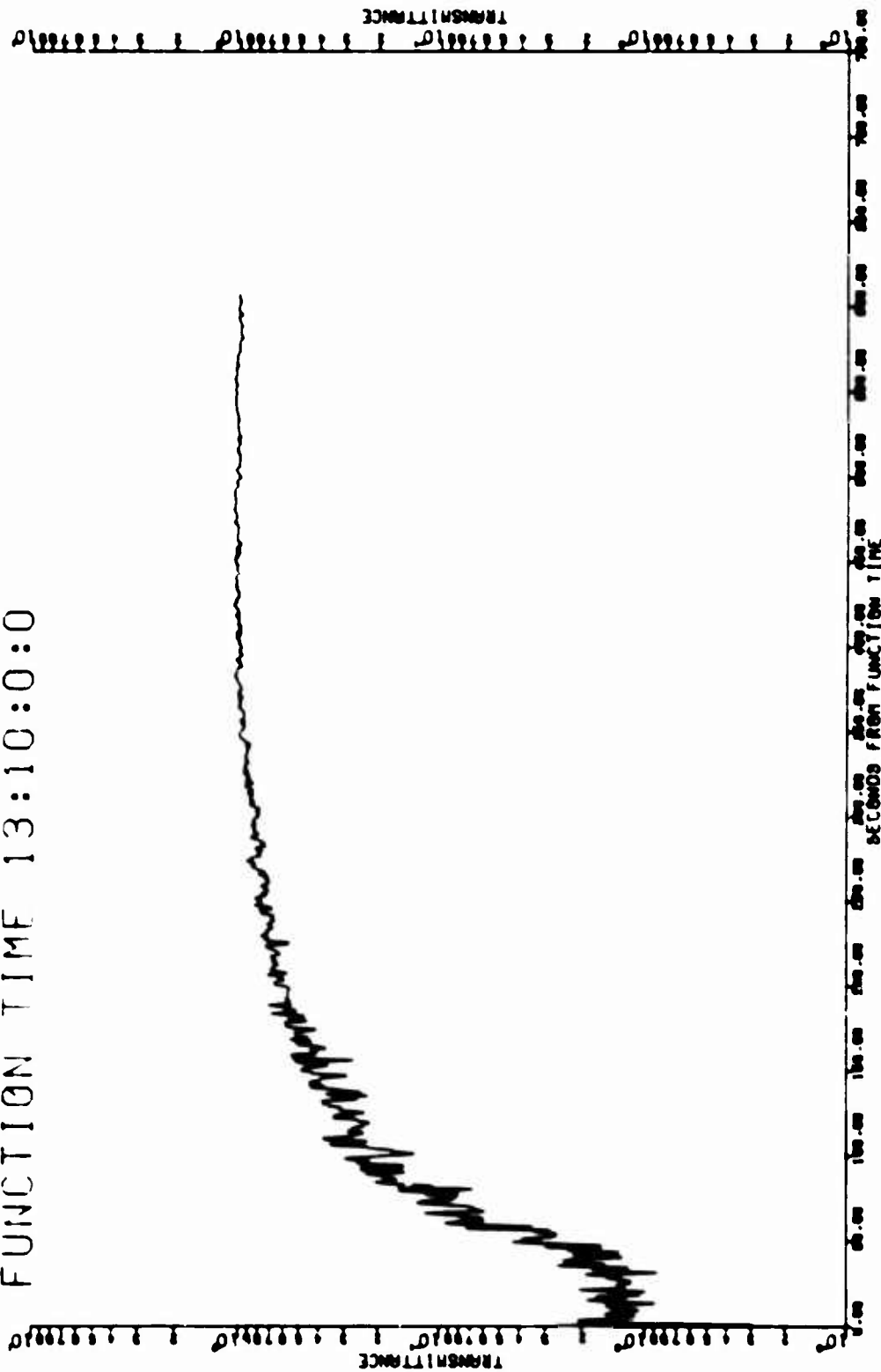
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:00



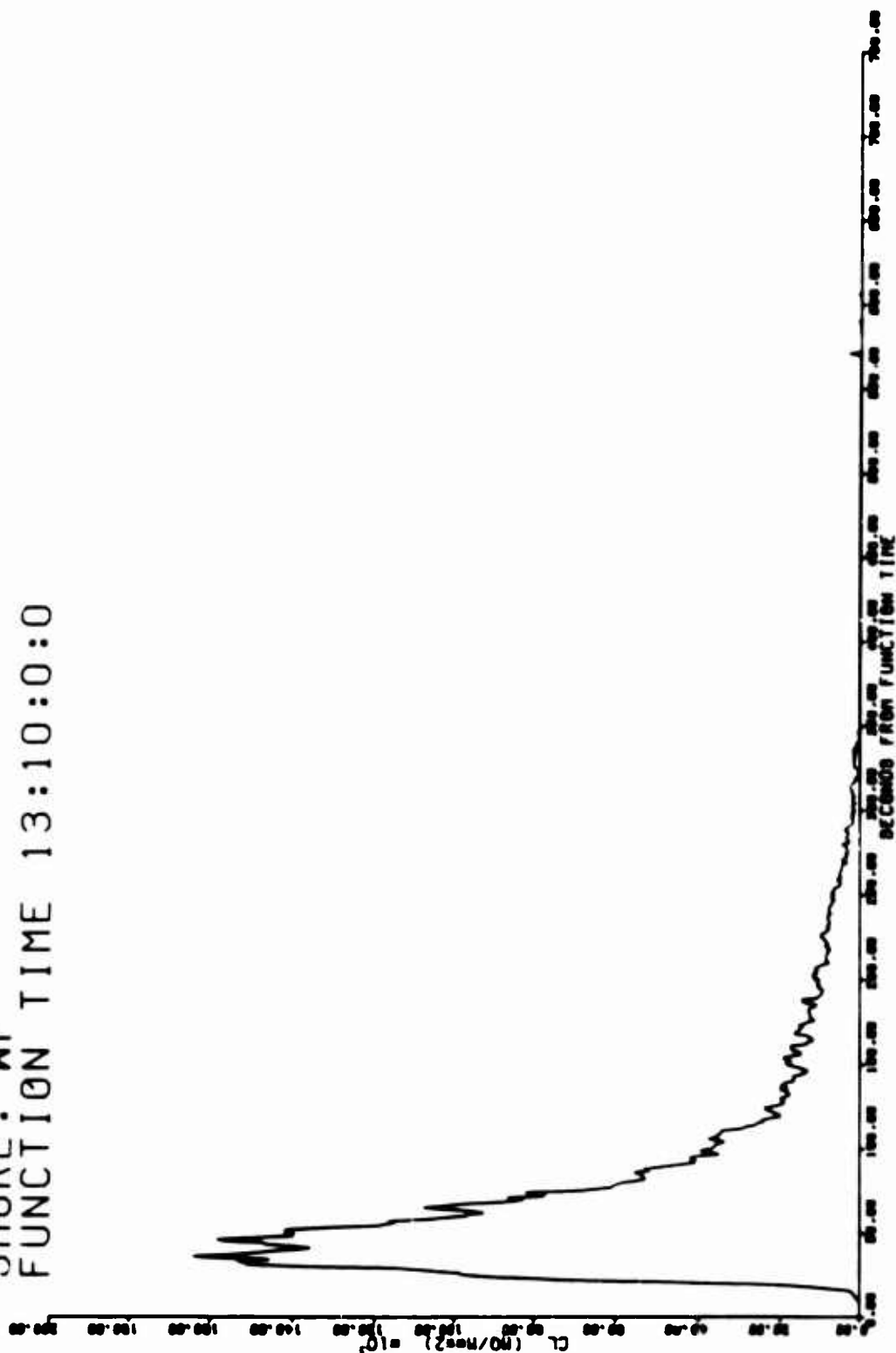
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.750 LOCATED ON ROW 0

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:00



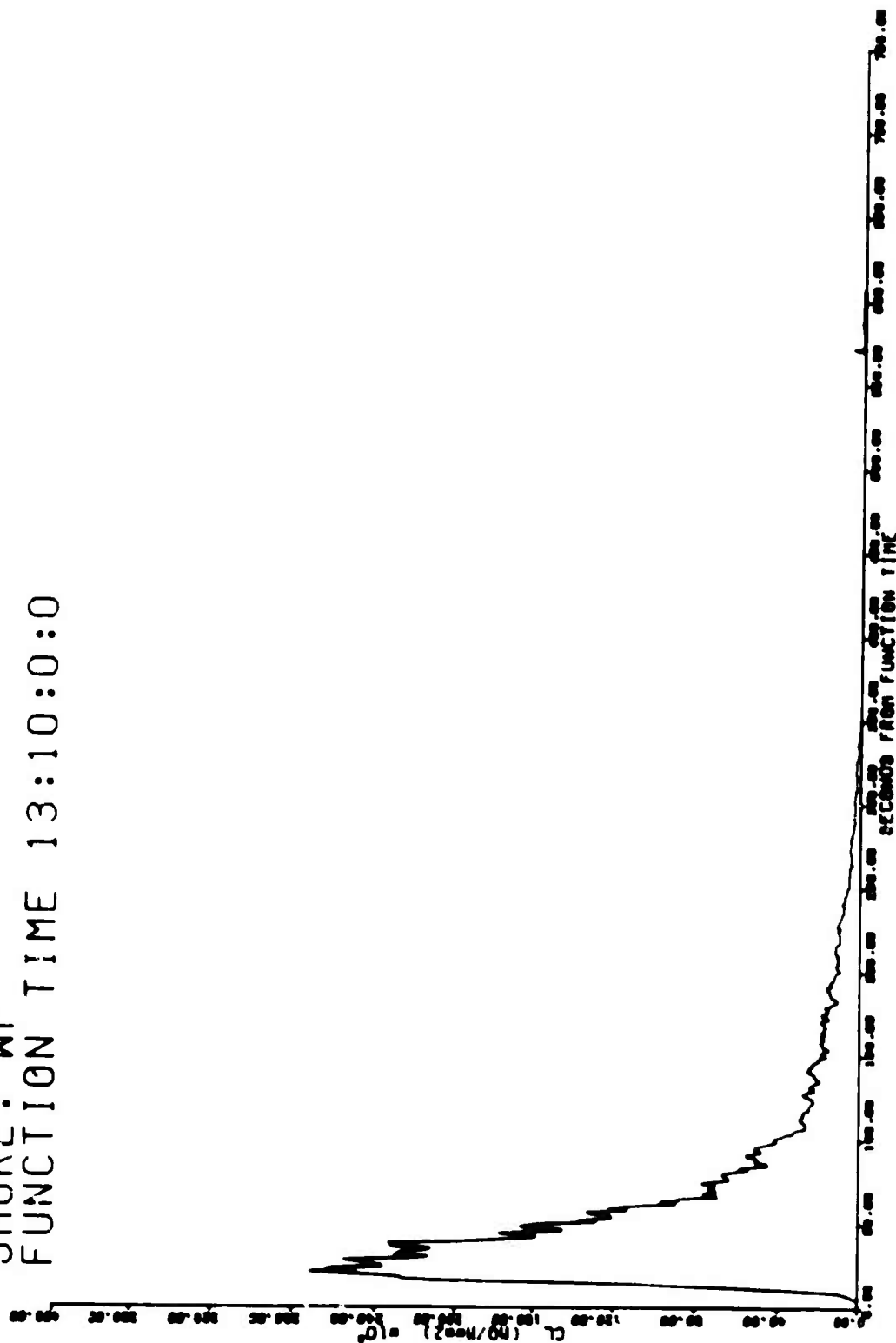
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #23 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:10:0:0



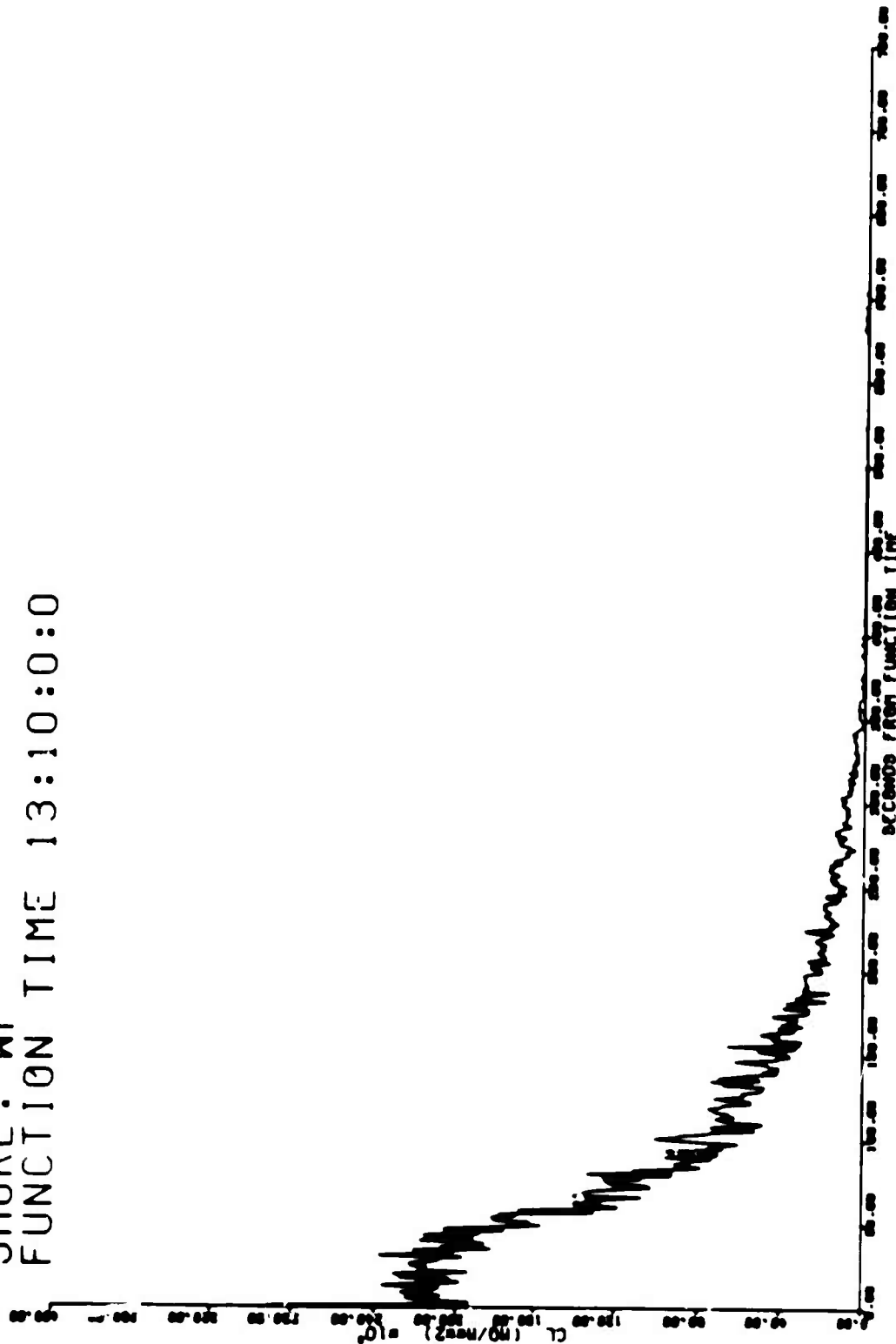
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:0:0



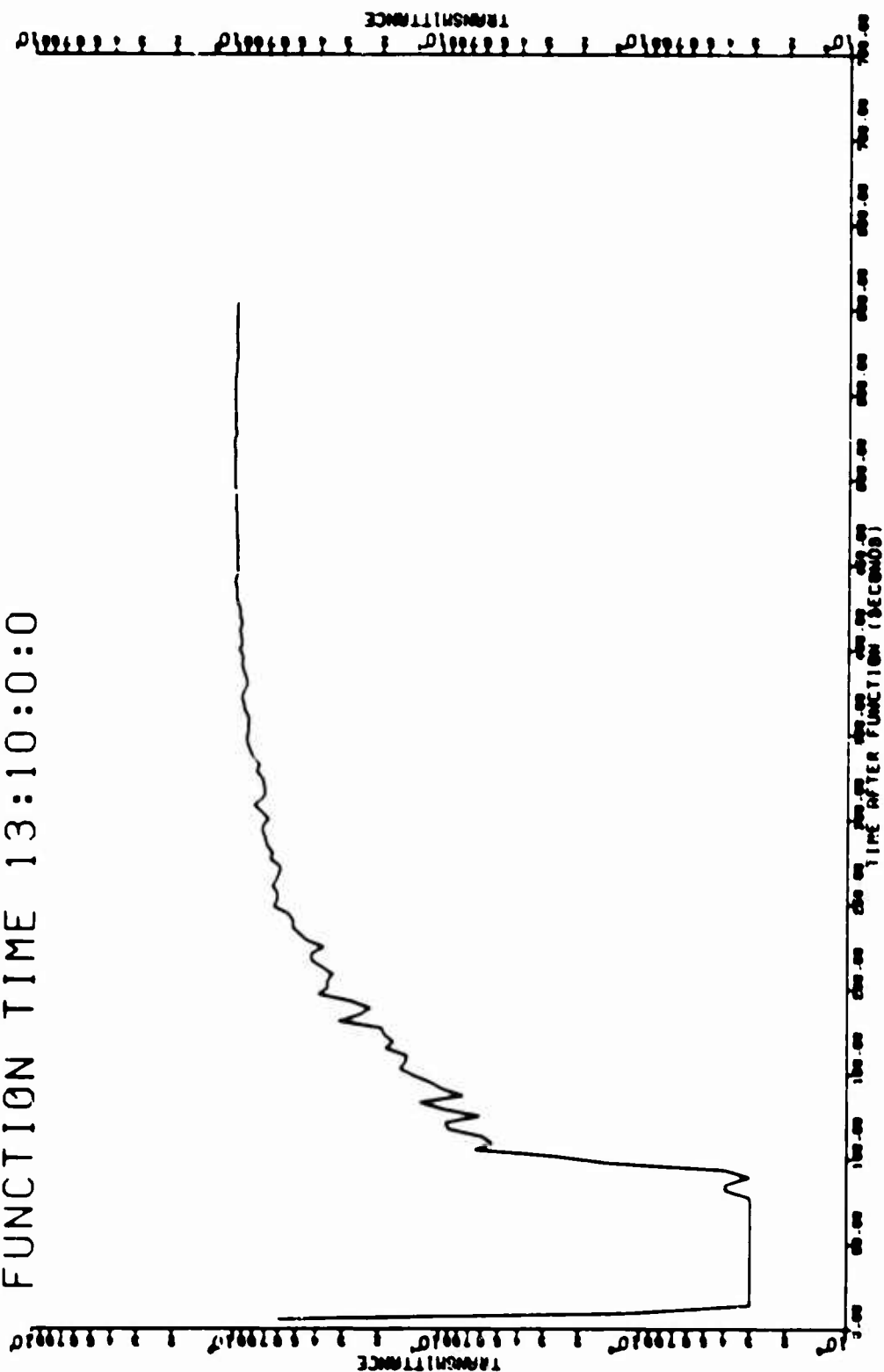
CL VALUES VERSUS TIME FOR ROW 0
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:0:0



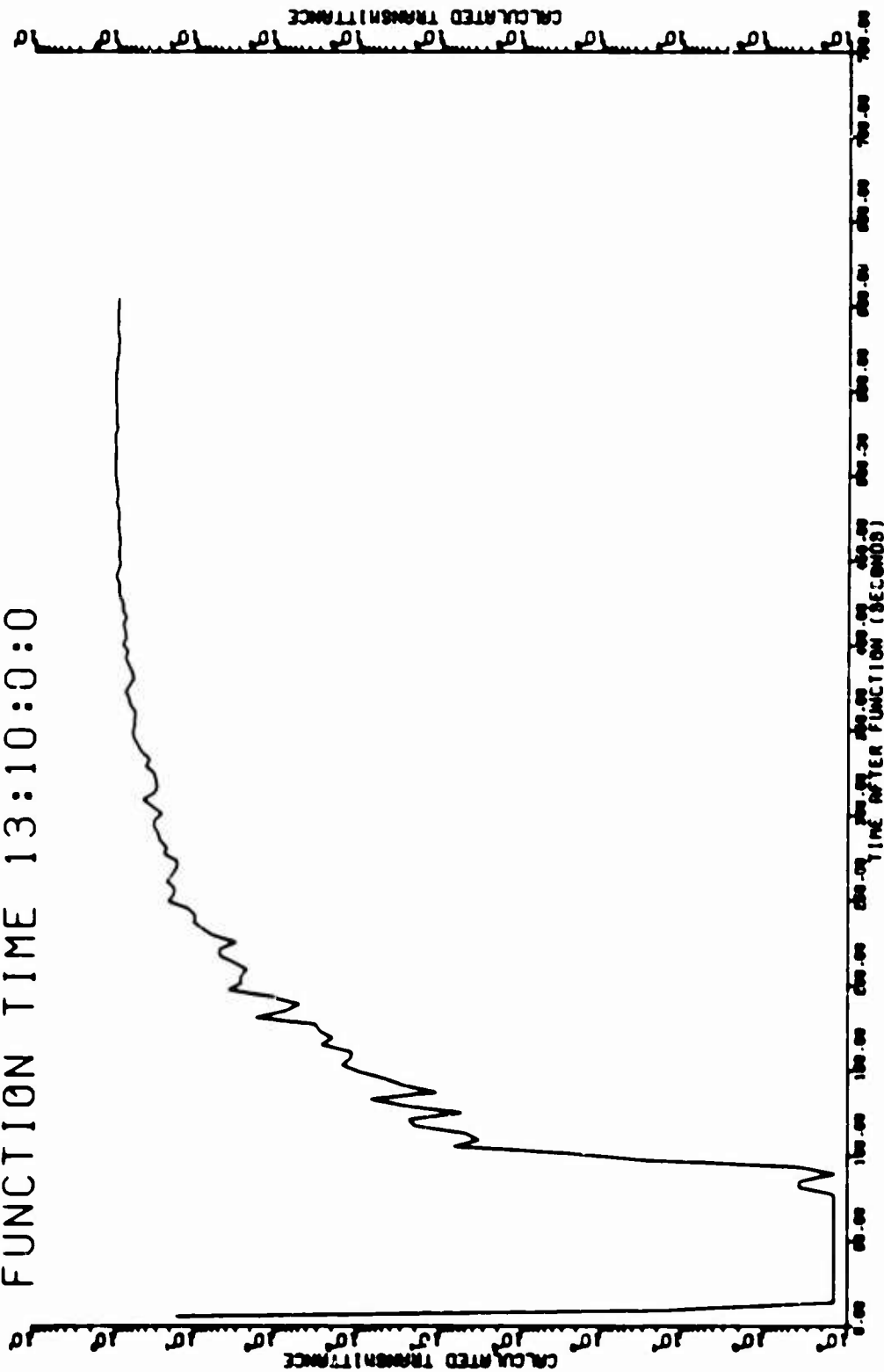
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:0:0



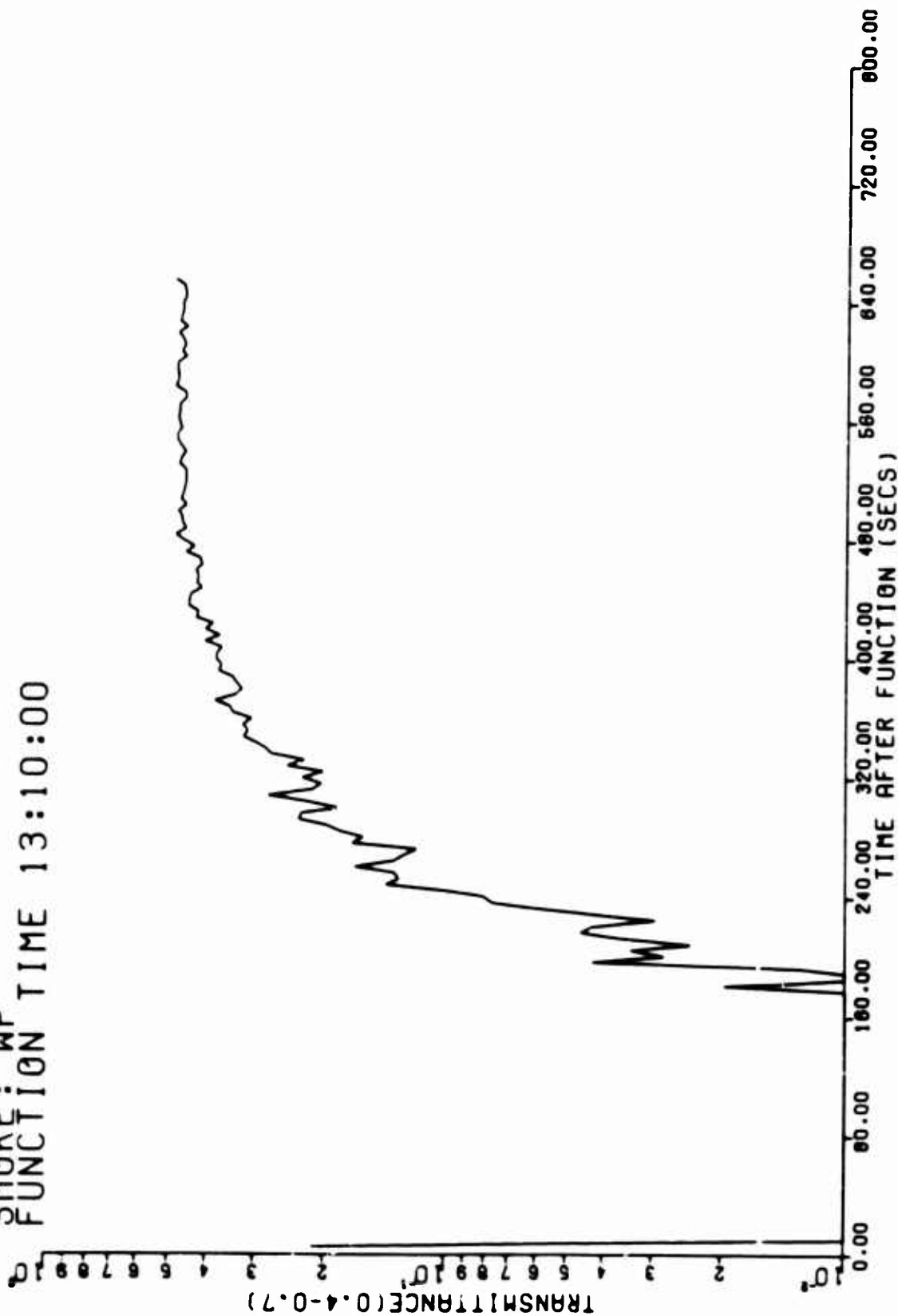
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #23 (DP1-002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:0:0



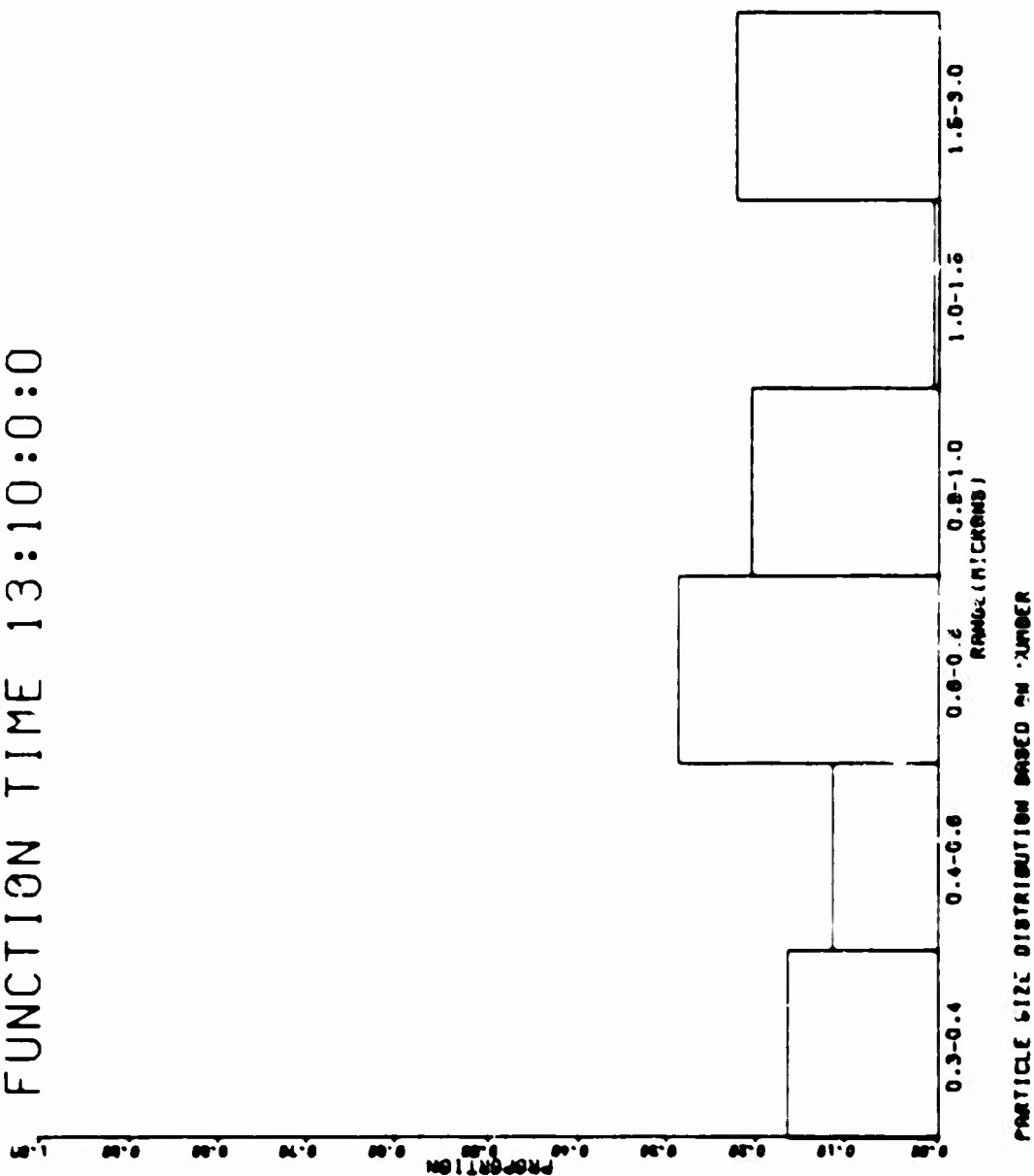
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

RIAL 23, (DP-1002)
DATE: 6 OCT 1977
SMOKE: WP
FUNCTION TIME 13:10:00

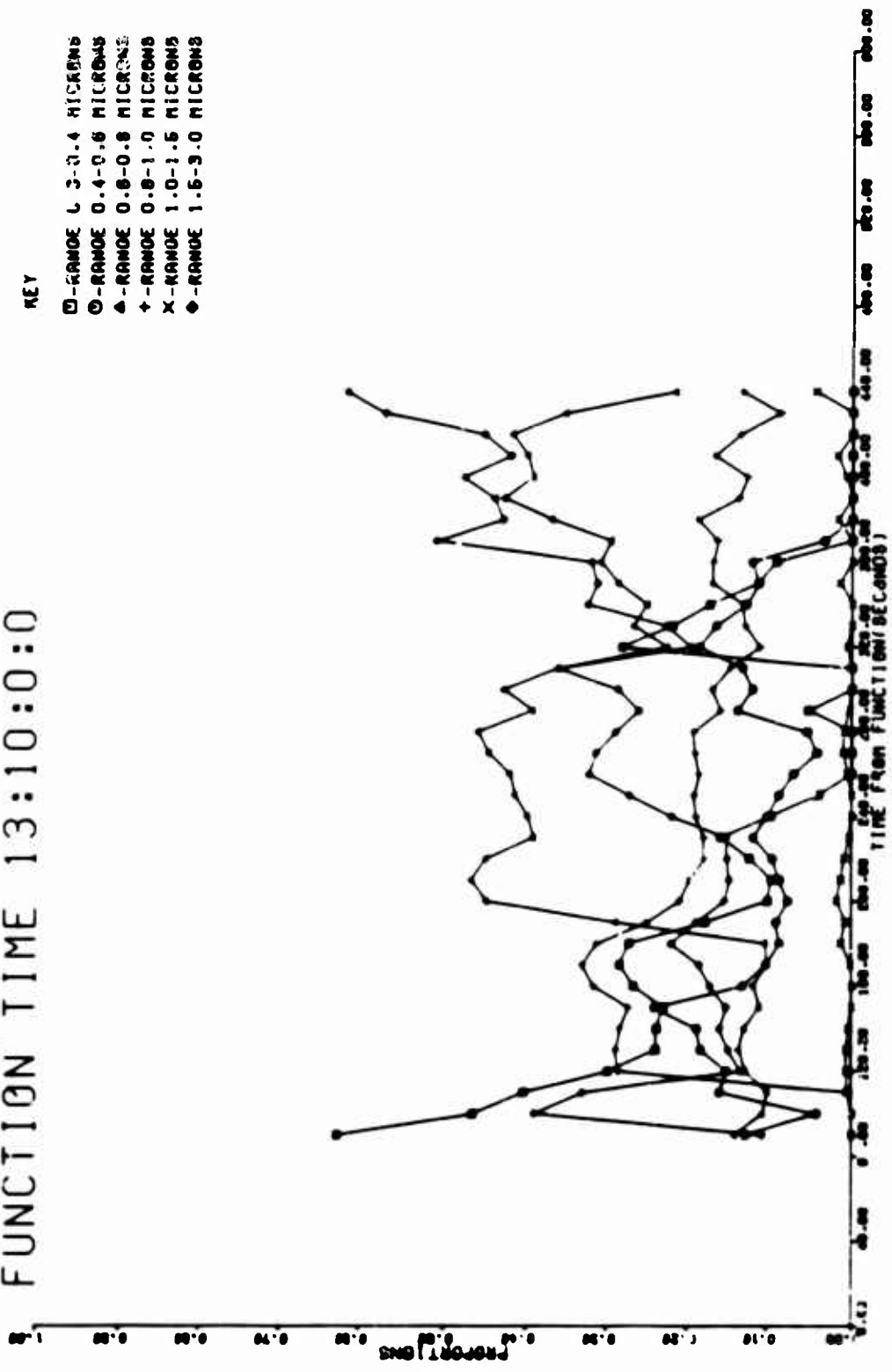


TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #23 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:10:0:0

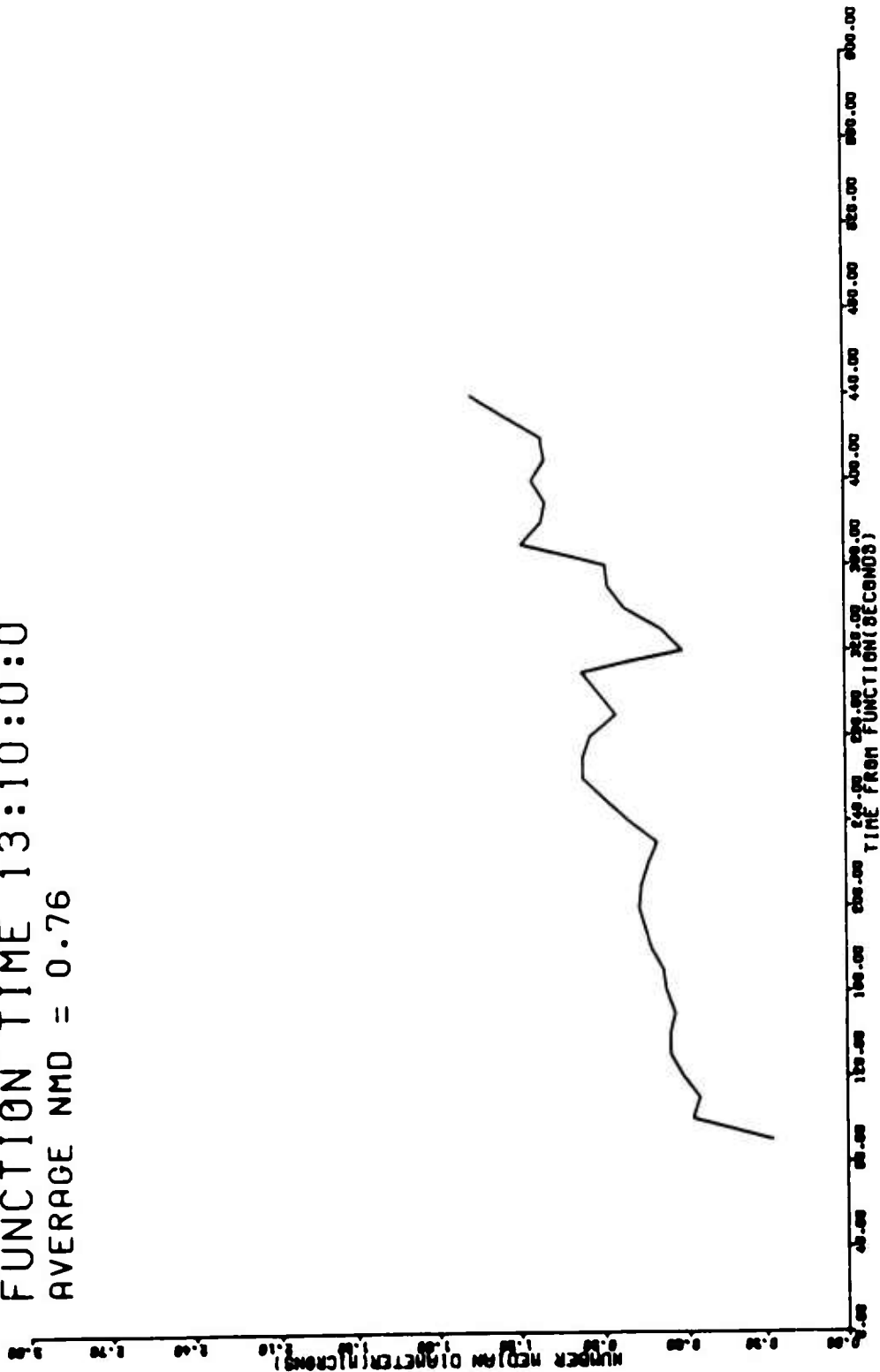


TRIAL #23 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:10:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #23 (DP1-002)
 DATE: 6 OCT 1977
 SMOKE: WP
 FUNCTION TIME 13:10:0:0
 AVERAGE NMD = 0.76



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-17

TRIAL DP1-002-T-25 (HC SMOKE) 26 OCT 1977

SUMMARY OF TEST DATA	B-I-17-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-17-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-17-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-17-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-17-12
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-17-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-17-14
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FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-17-16
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-17-17
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-17-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-17-19
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-17-20
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-17-21
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-17-22

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 B-I-17-23

FIGURE: PARTICLE SIZE DISTRIBUTION B-I-17-24

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME B-I-17-25

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME B-I-17-26

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #25

Date: 26 Oct 77

Time: 1430 MDT

Wind Direction (Transport) (degrees) (4m)	325
Mean Wind Speed (Transport) (\bar{u} , m/sec)	3.2
Temperature at 2-meters, Trial Time (T, °C)	24.3
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	30.8
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	9.5
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.07
Pasquill Stability Category	B
Relative Humidity (percent) (2m)	17.0
Solar Azimuth (deg)	201.9
Solar Altitude (deg)	34.5
Air Density - ρ (kg m ⁻³)	1.012
Solar Radiation (Langley's per minute)	0.843
Barometric Pressure (millibars)	866.2
Visibility (km)	137
Reflectivity, OD Target	0.09
Haze (footlamberts)	209
Brightness, Background (footlamberts)	900
Brightness, White Target (footlamberts)	1607
Brightness, OD Target	350
Percent Opaque Cloud Cover	0

Munitions/Submunitions Used (HC, 155mm Canisters)	4
Number of Munitions/Submunitions Functioned	3
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.34
(0.4 - 0.6) . . . . .	.31
(0.6 - 0.8) . . . . .	.17
(0.8 - 1.0) . . . . .	.08
(1.0 - 1.5) . . . . .	.08
(1.5 - 3.0) . . . . .	.01
$\log_{10} \text{NMD}$	-.30740
$\sigma \log_{10} \text{NMD}$ . . . . .	.22594
NMD . . . . .	.49
MMD . . . . .	.65

Initial Cloud Dimensions (Meters)

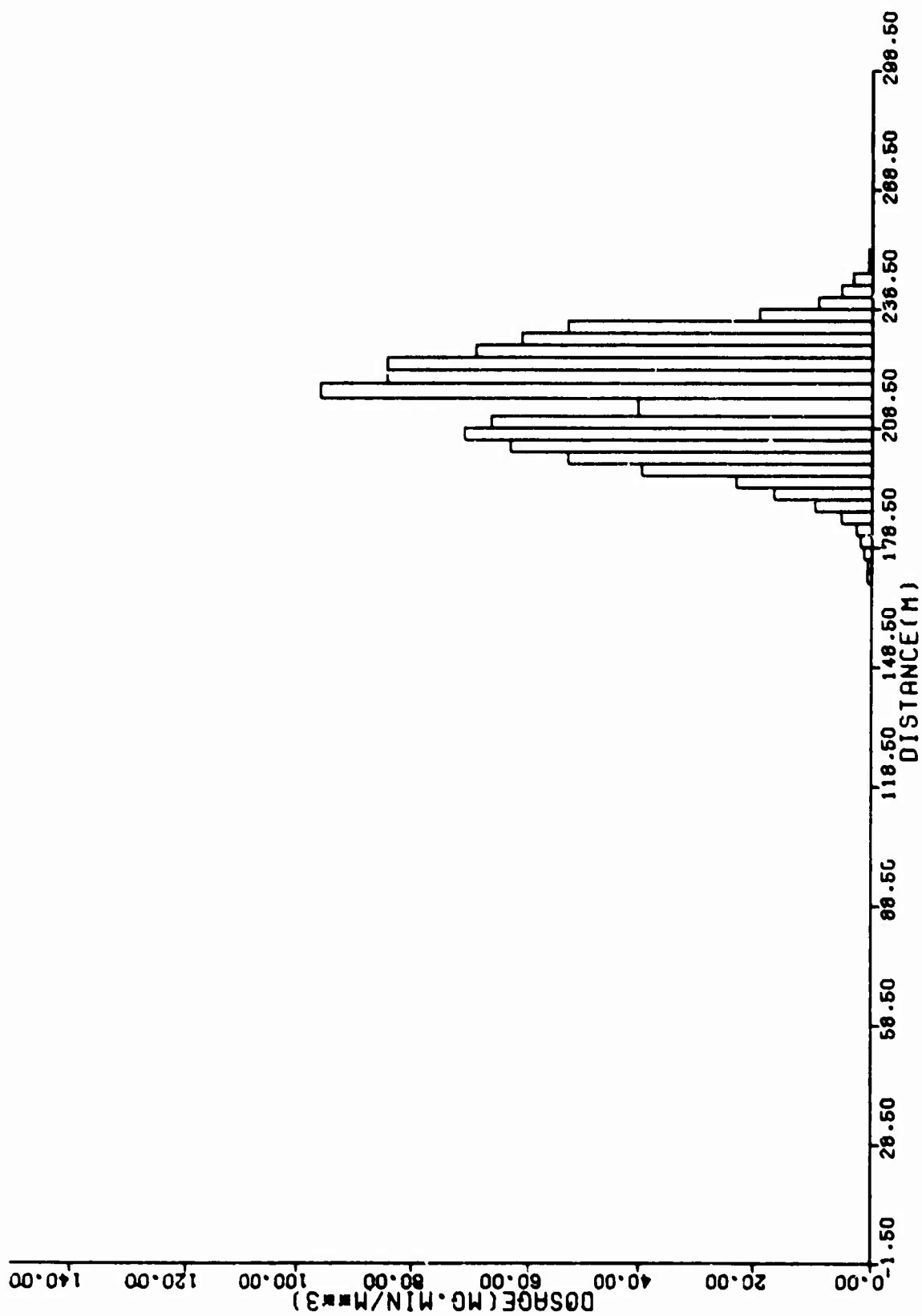
<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1430:00	8	13	2
1430:10	38	22	6
1430:20	49	28	8
1430:30	98	28	12
1430:40	112	31	13
1430:50	116	33	13
1431:00	133	35	18
1431:10	154	36	20
1431:20	162	41	17
1431:30	205	53	8
1431:40	207	54	8
1431:50	198	58	9
1432:00	185	58	10

SKY BRIGHTNESS

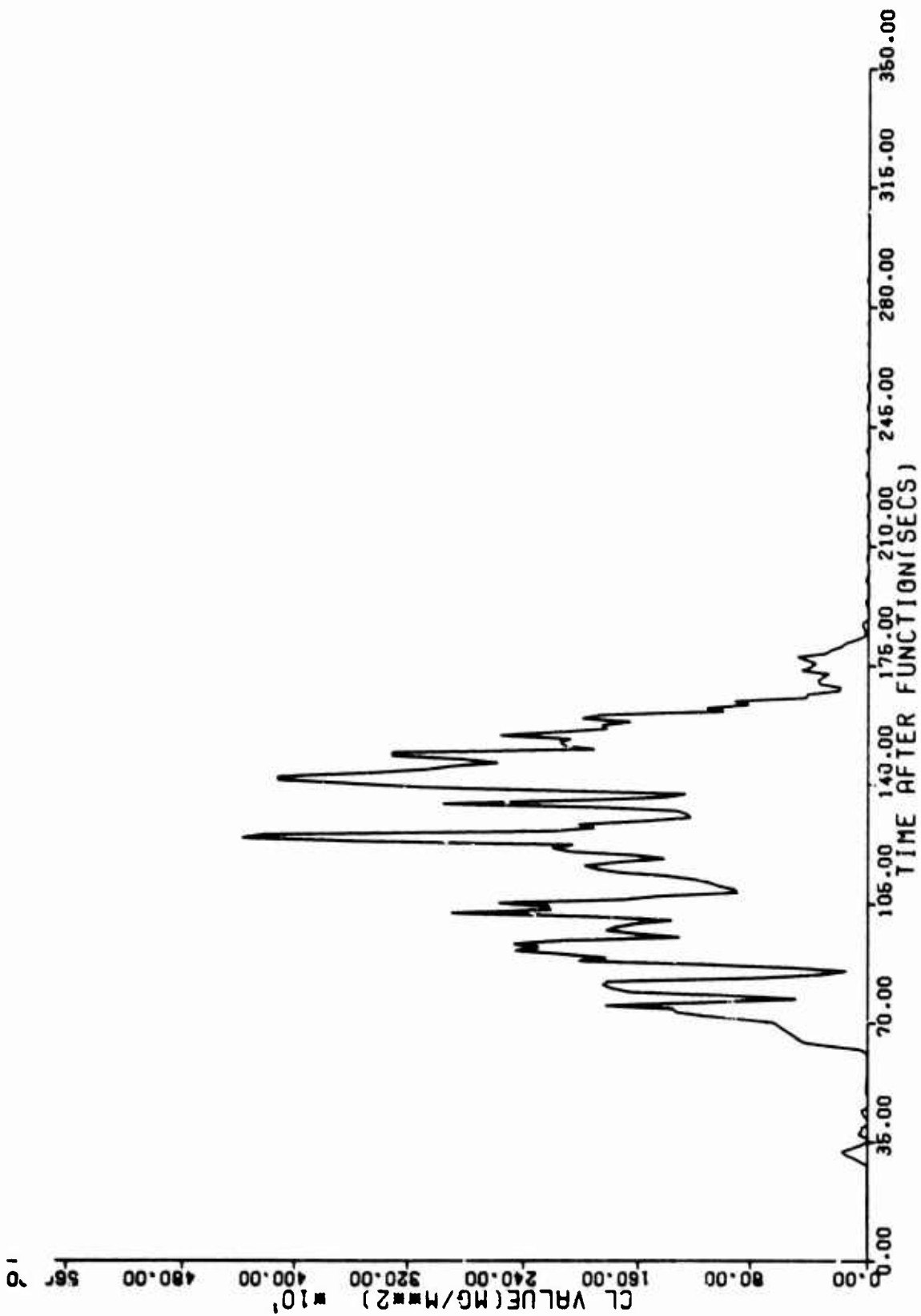
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	652
5	1140
10	1140
15	1140
20	1300
25	1300
30	1300
35	1300
40	1300
45	1140

Viewing azimuth 240° except 255° at 0 degrees elevation

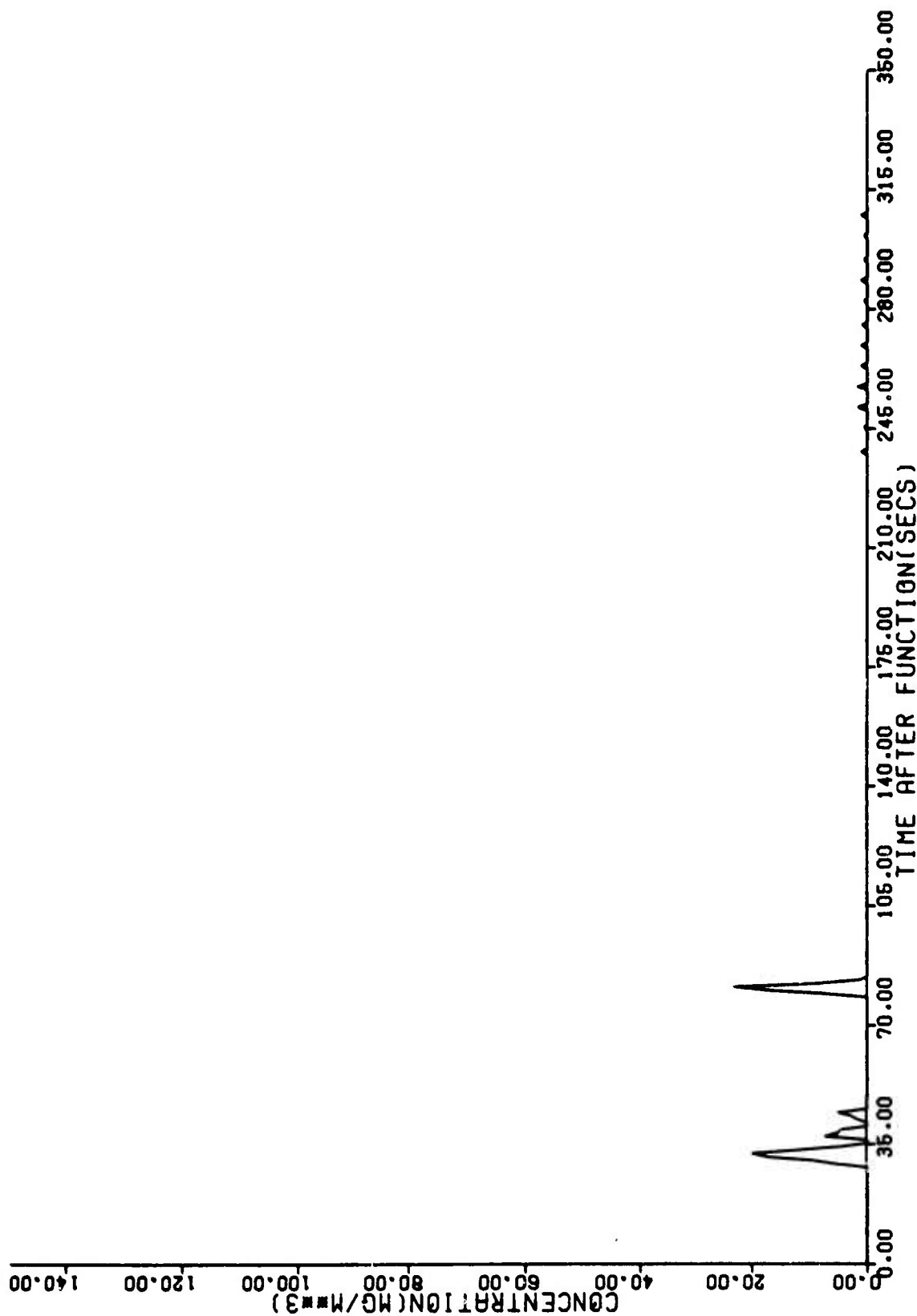


TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE



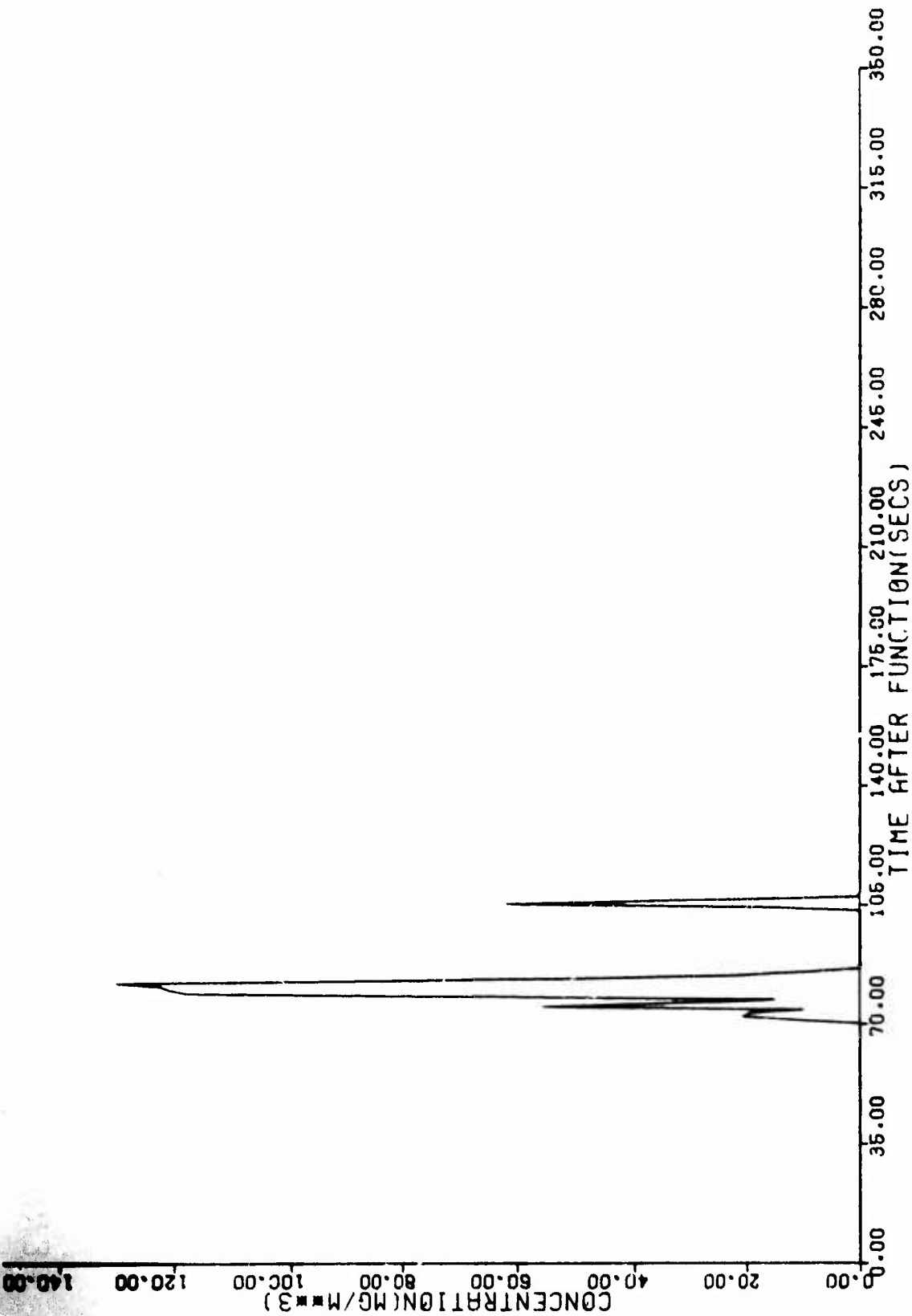
TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



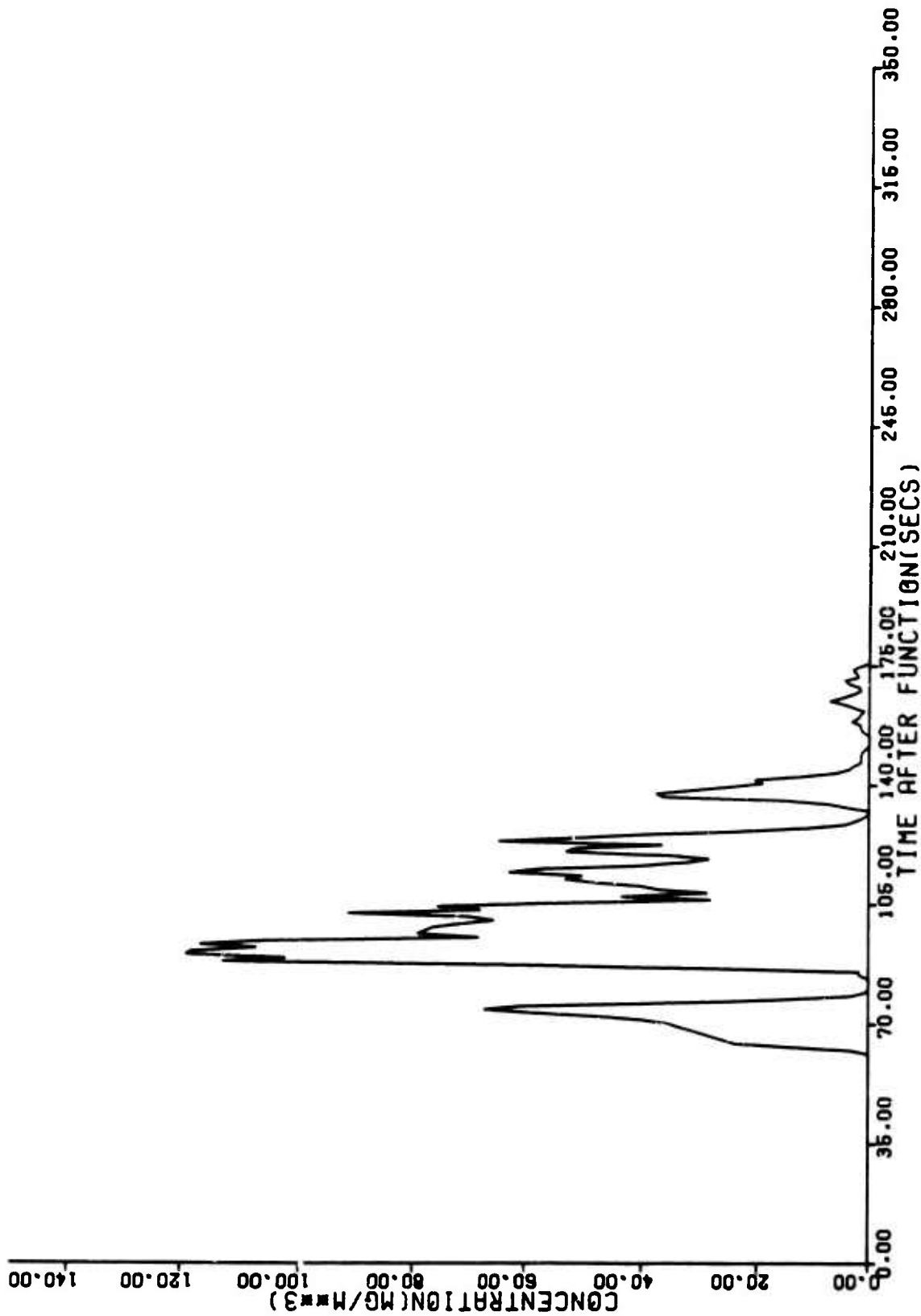
TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE

AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00



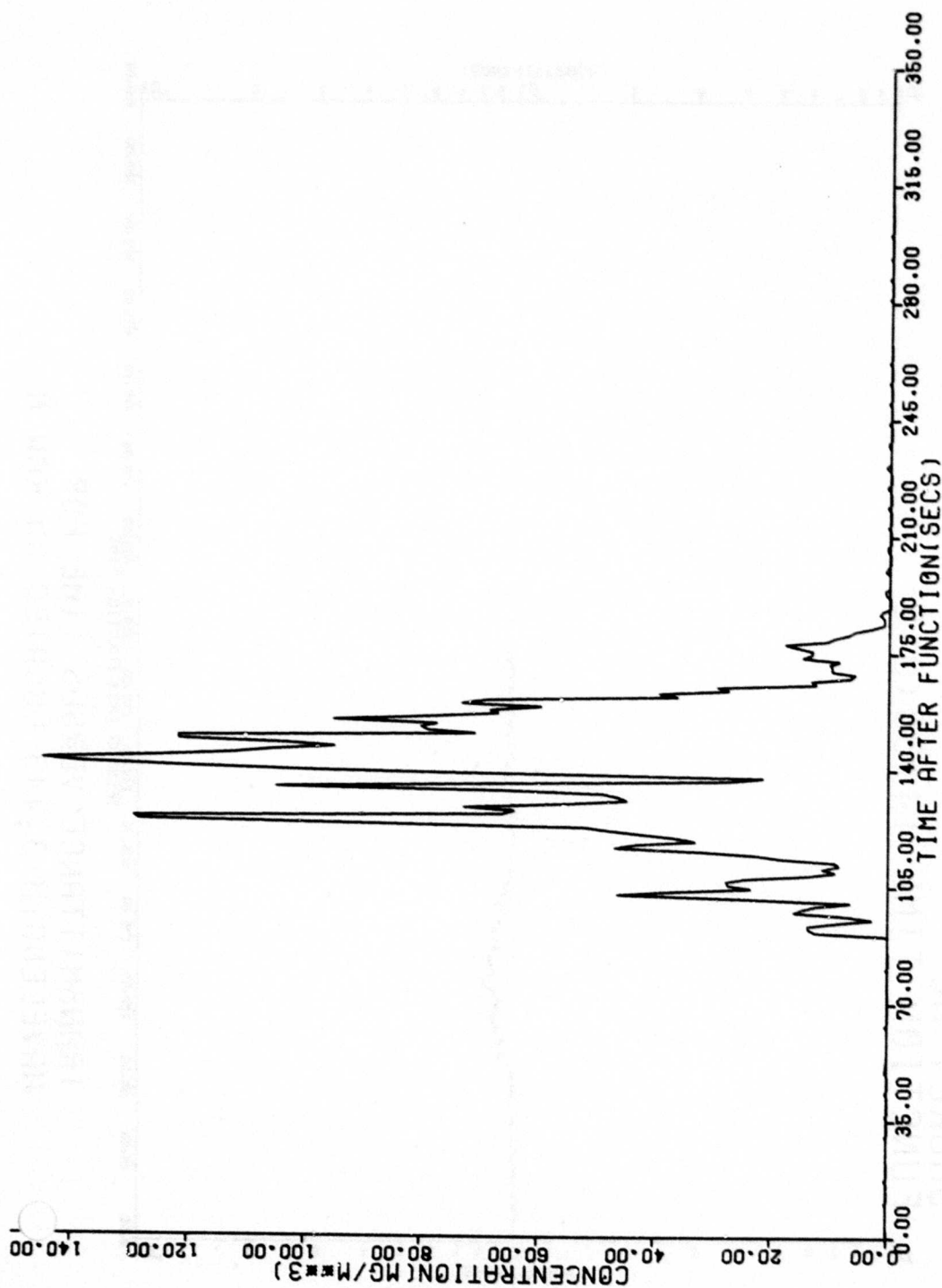
TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE

AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE

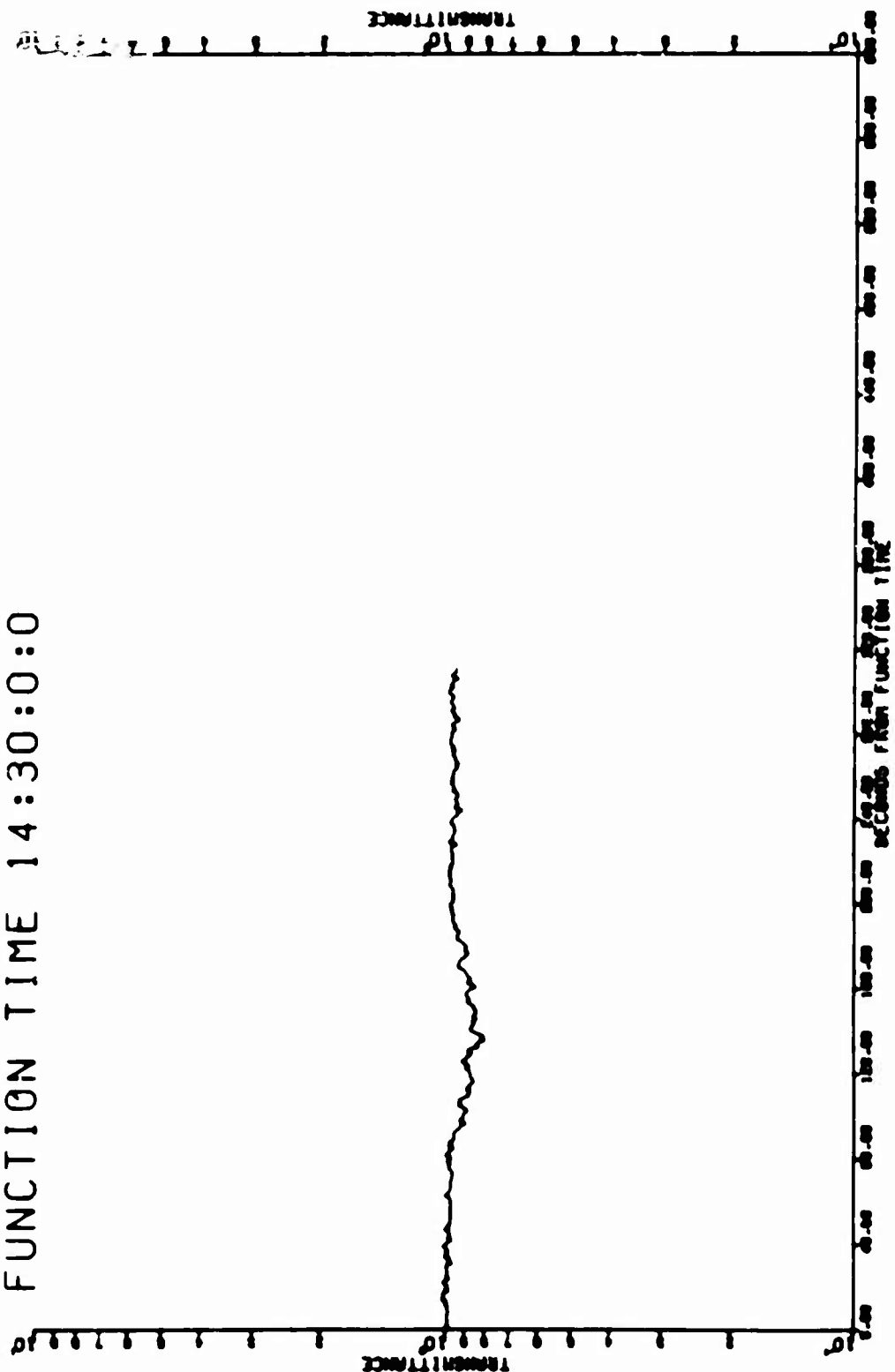
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00



TRIAL 25 (DP-1002), 26 OCT 1977, 14:30:00, HC SMOKE

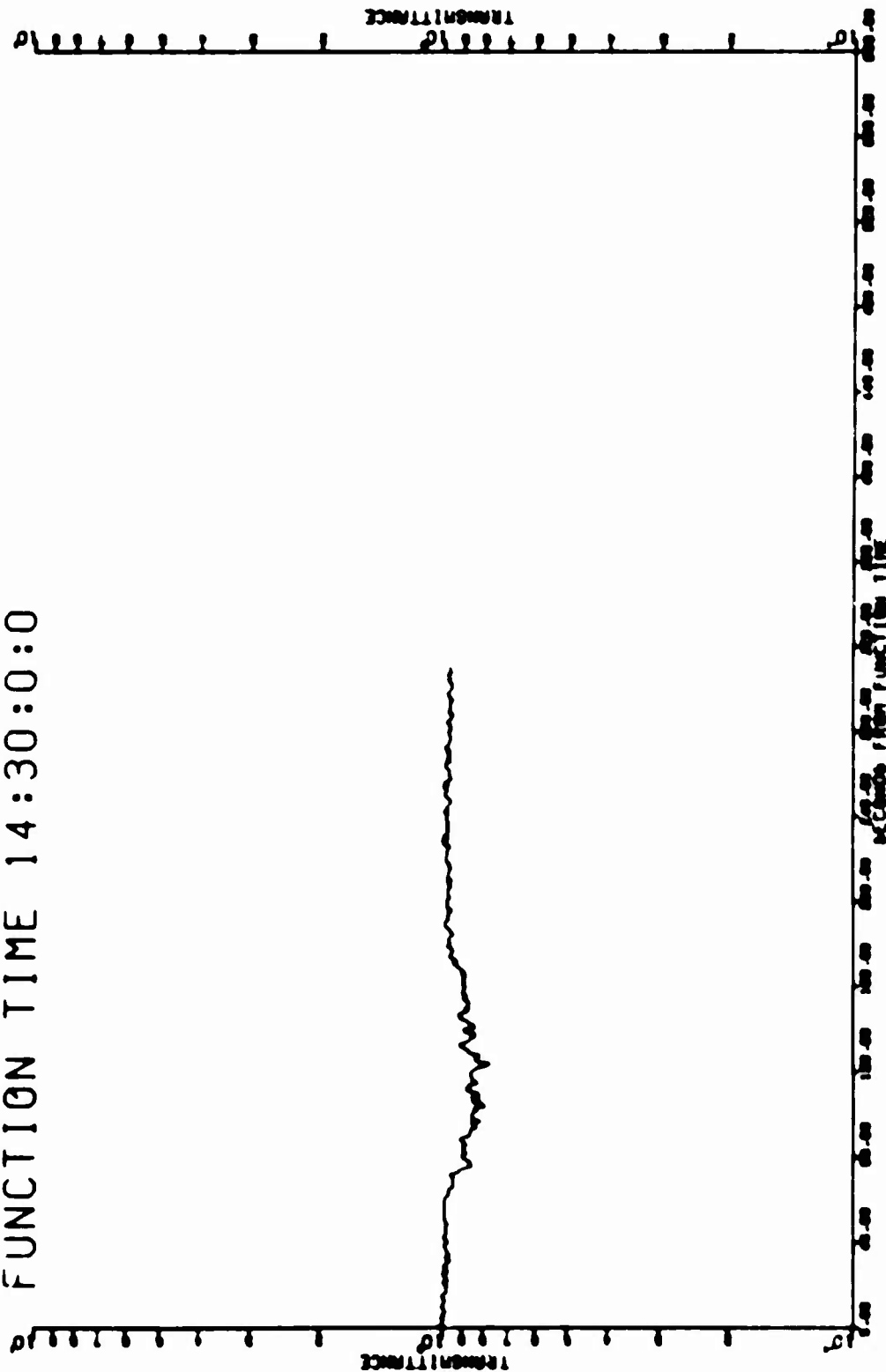
AEROSOL PHOTOMETER #17, X=0.00, Y=228.00, Z=0.00

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



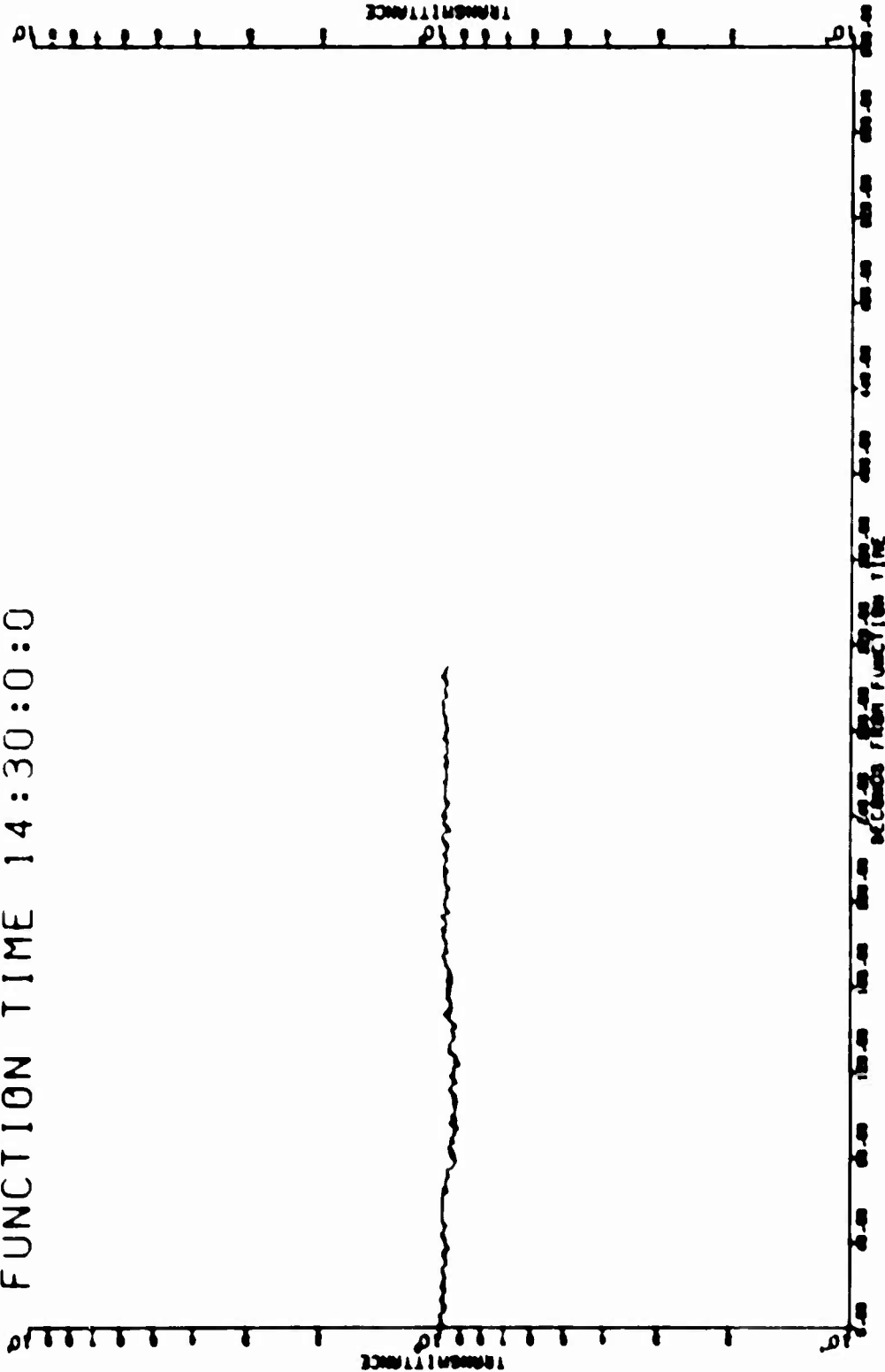
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



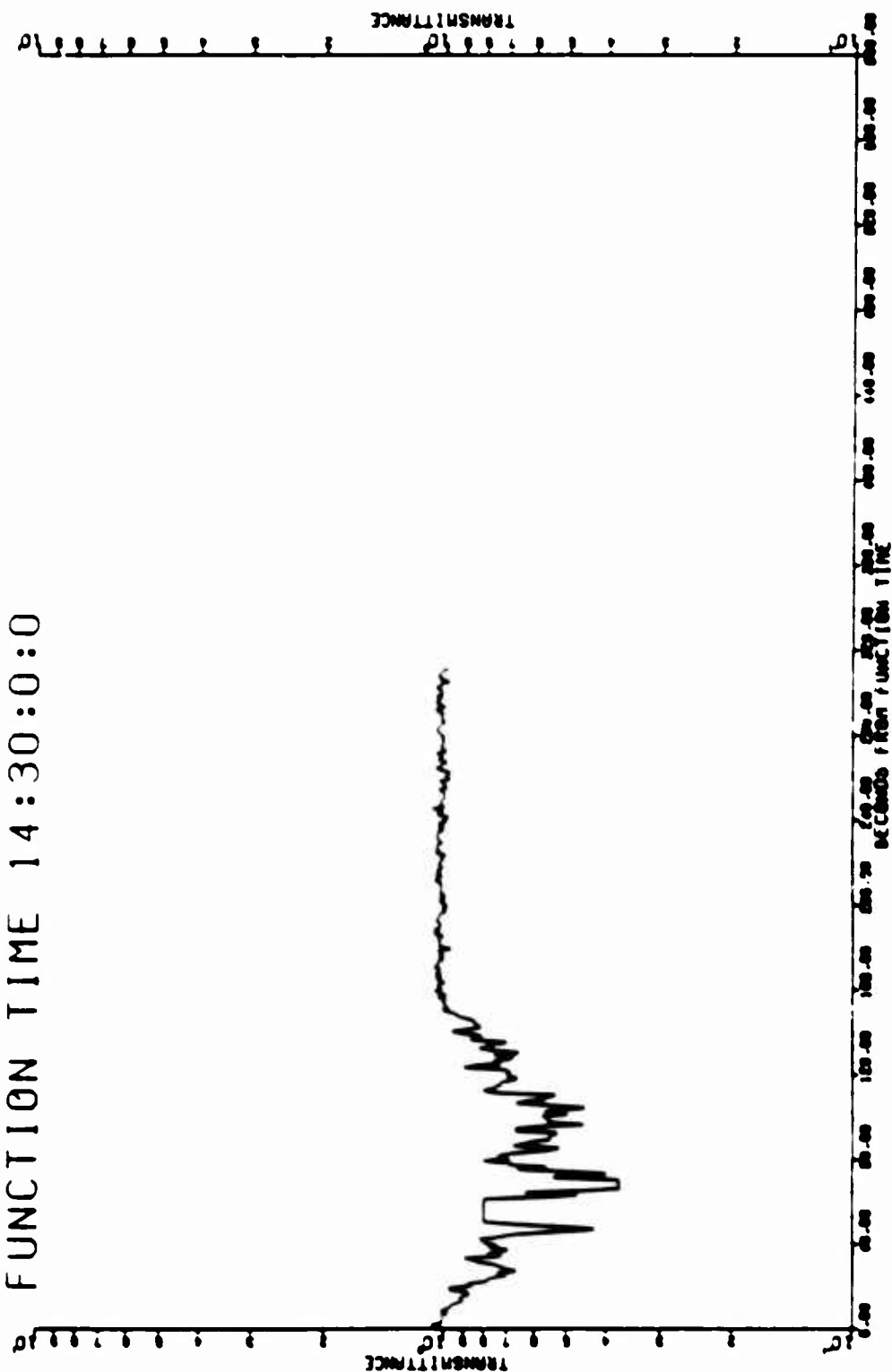
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



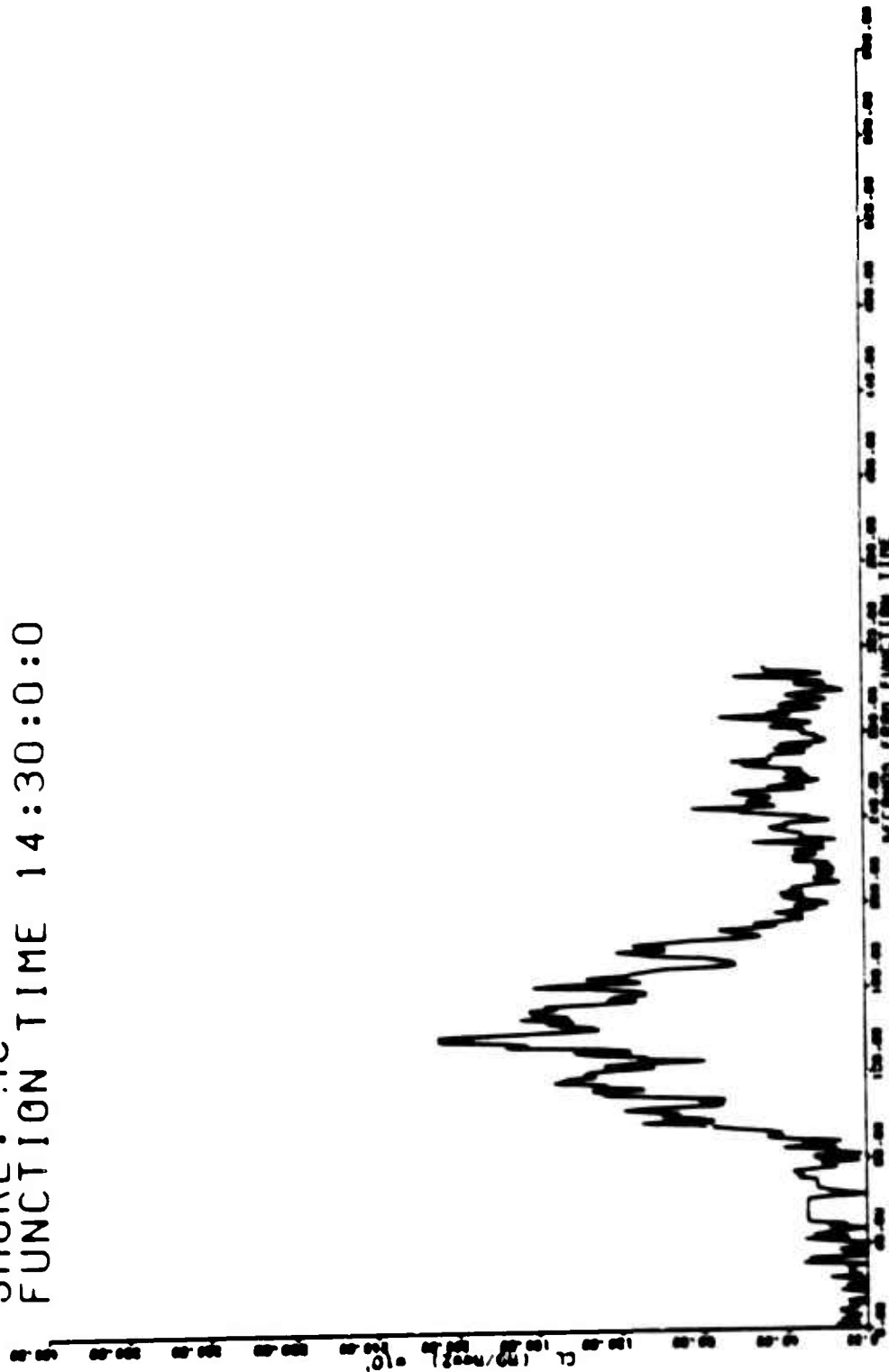
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



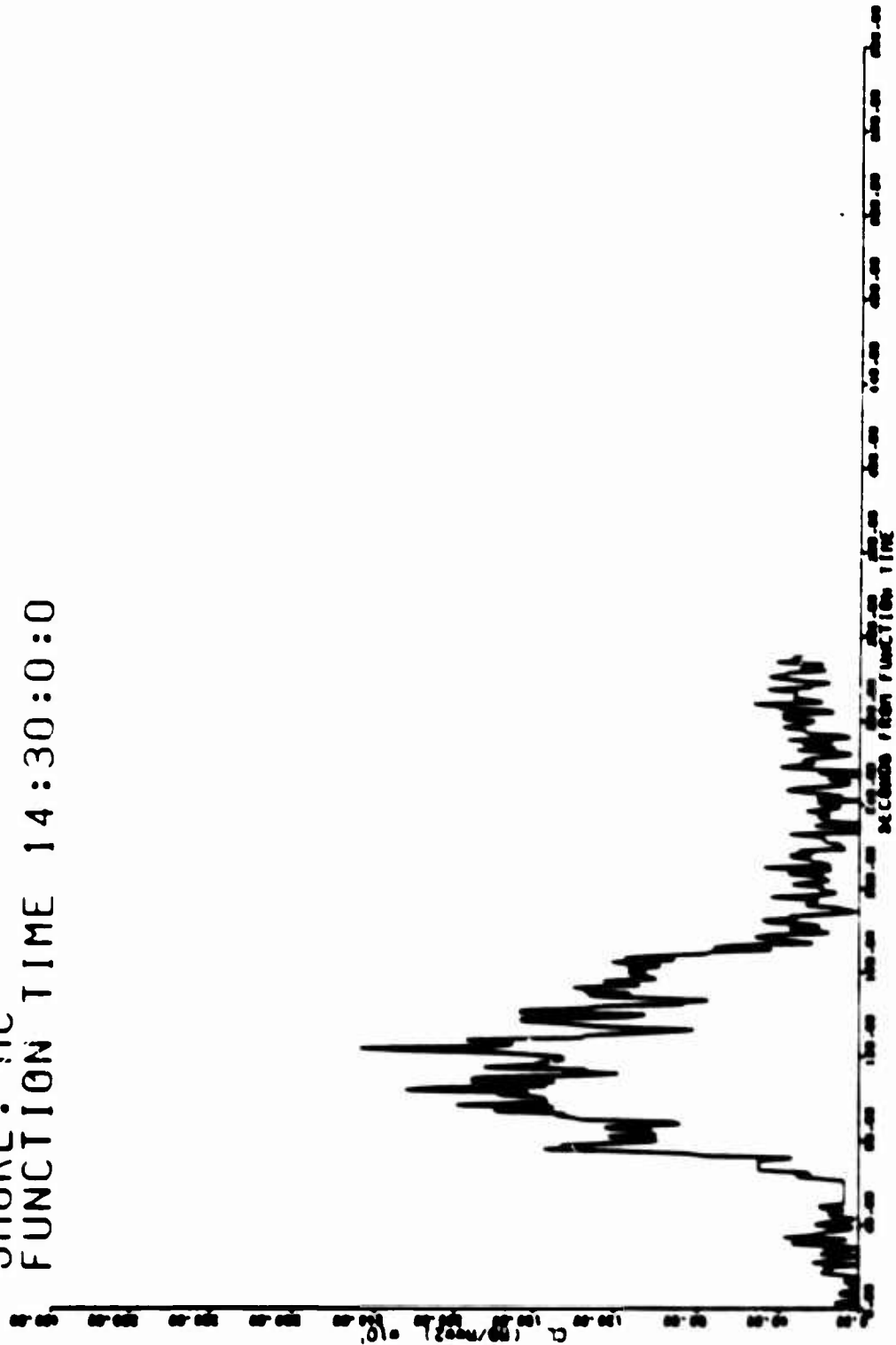
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW 0

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



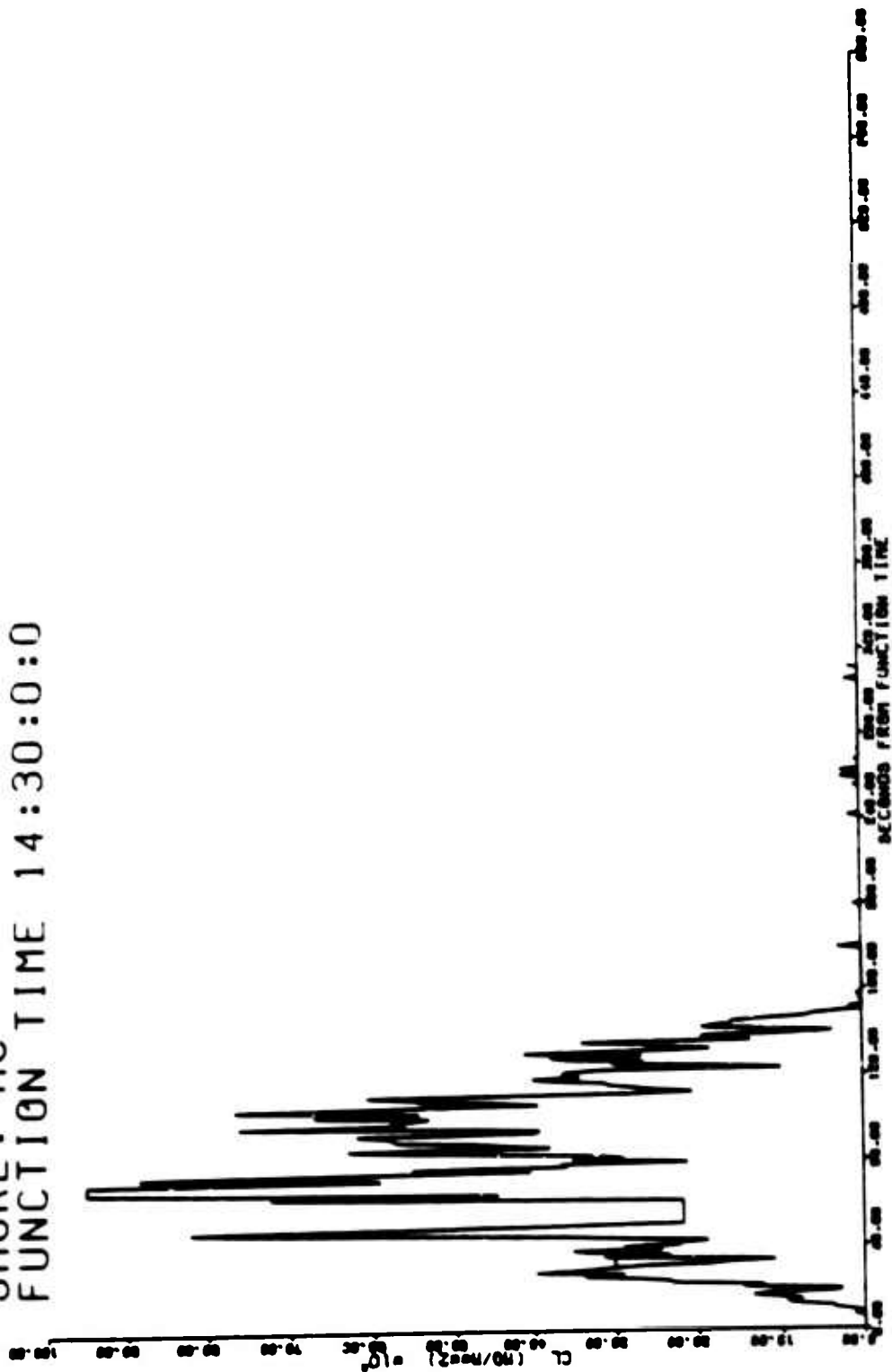
CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:00



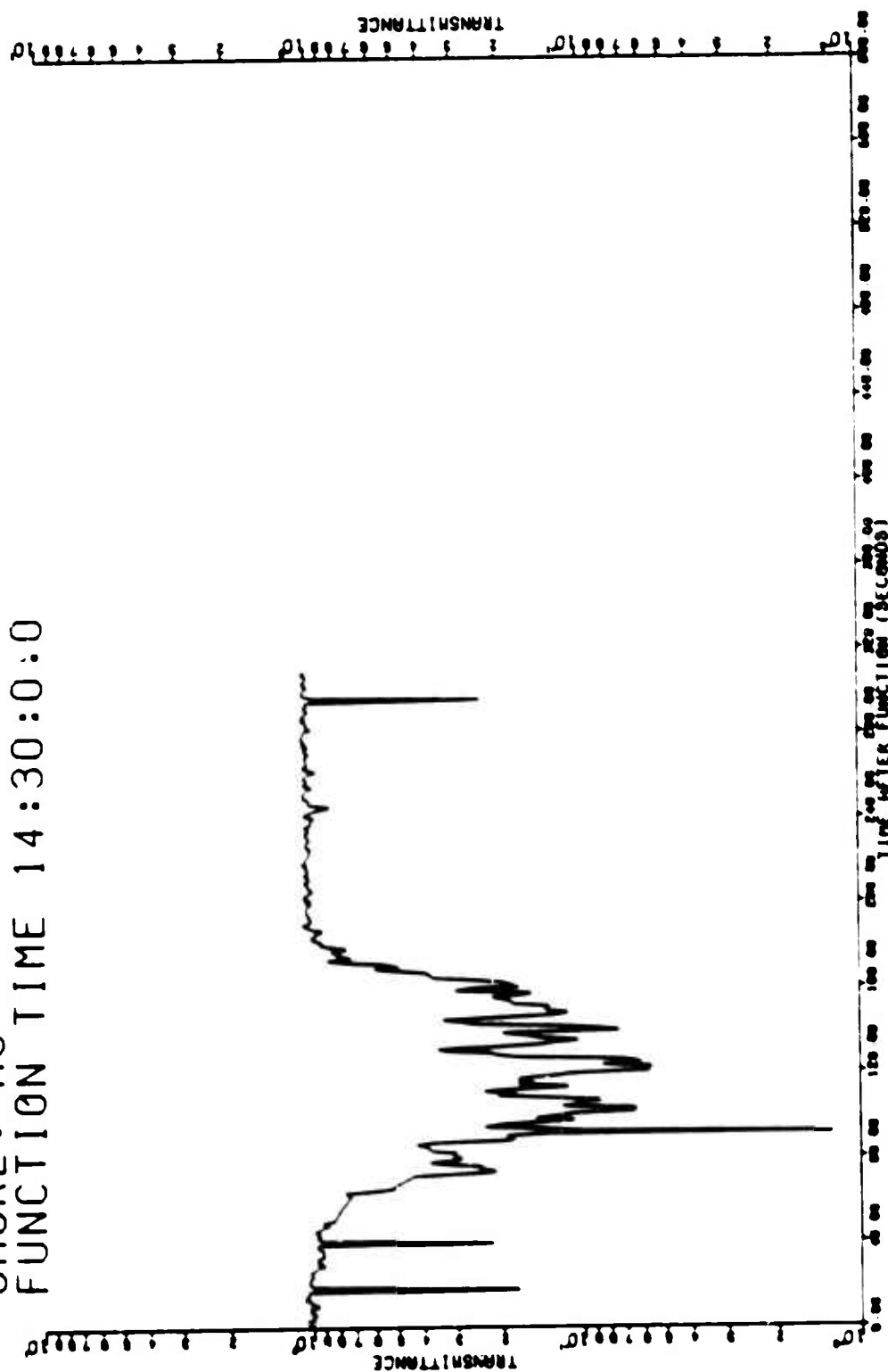
CL VALUES VERSUS TIME FOR ROW 0
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



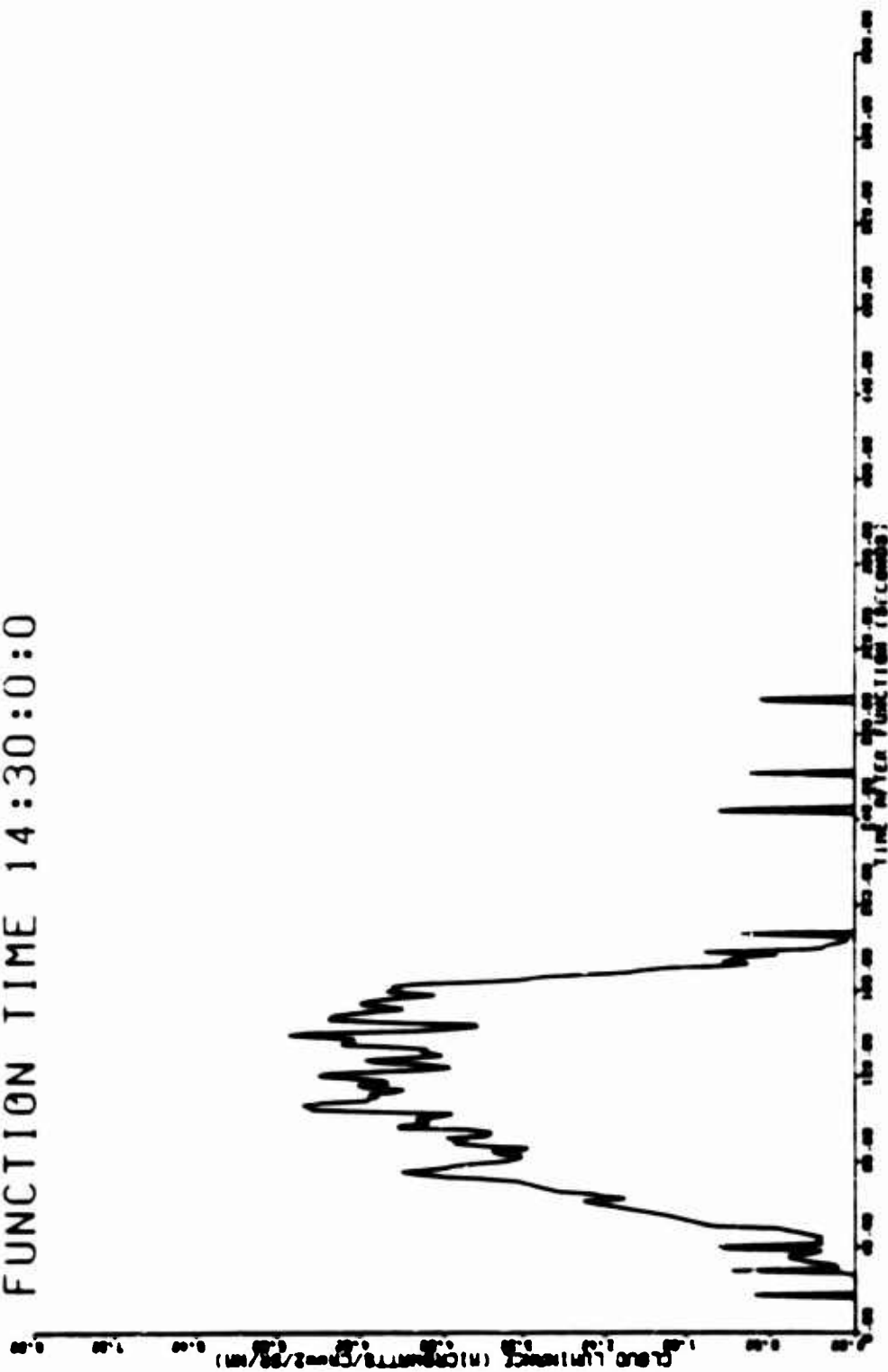
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



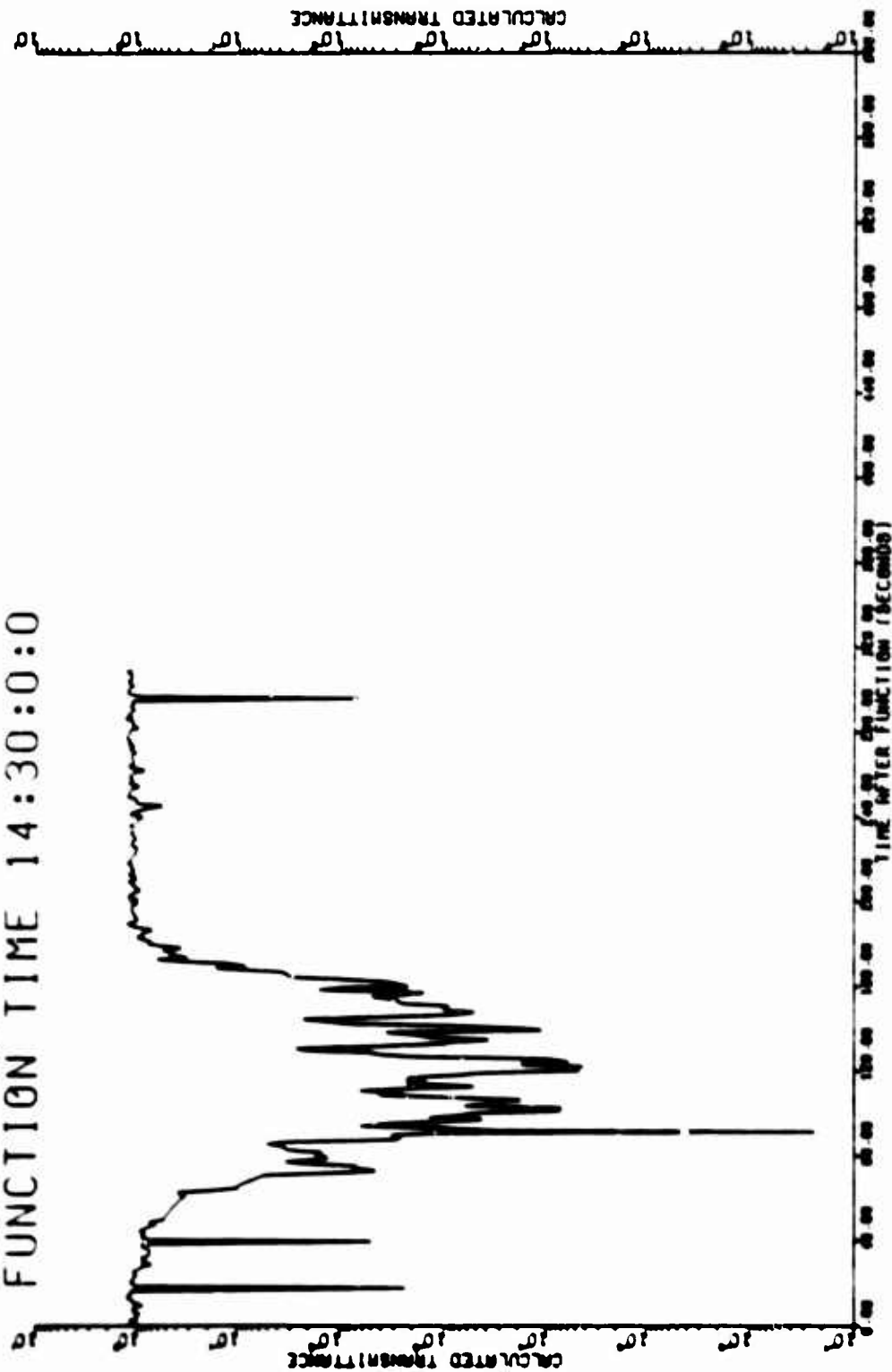
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #25 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:0:0



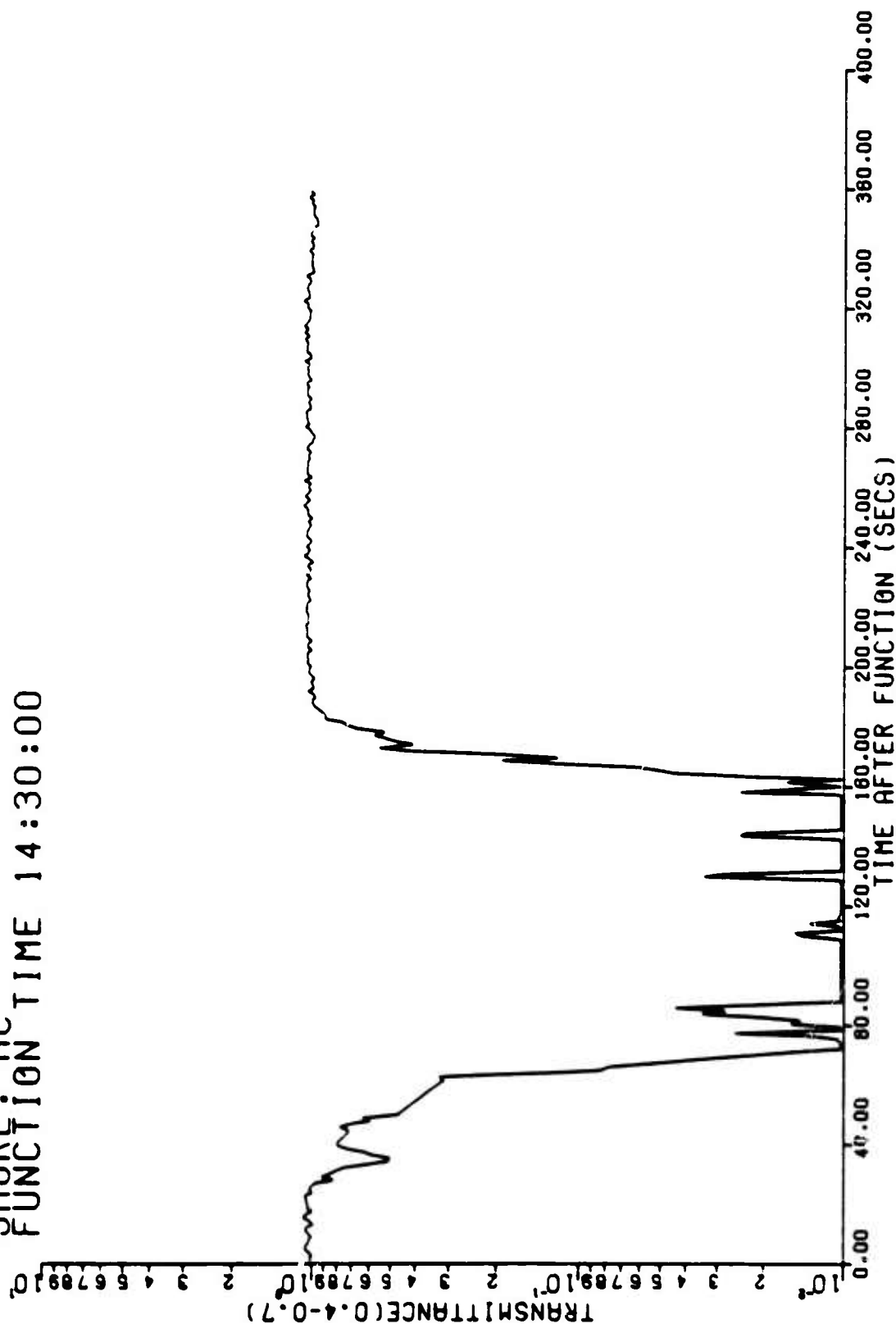
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #25 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:30:0:0



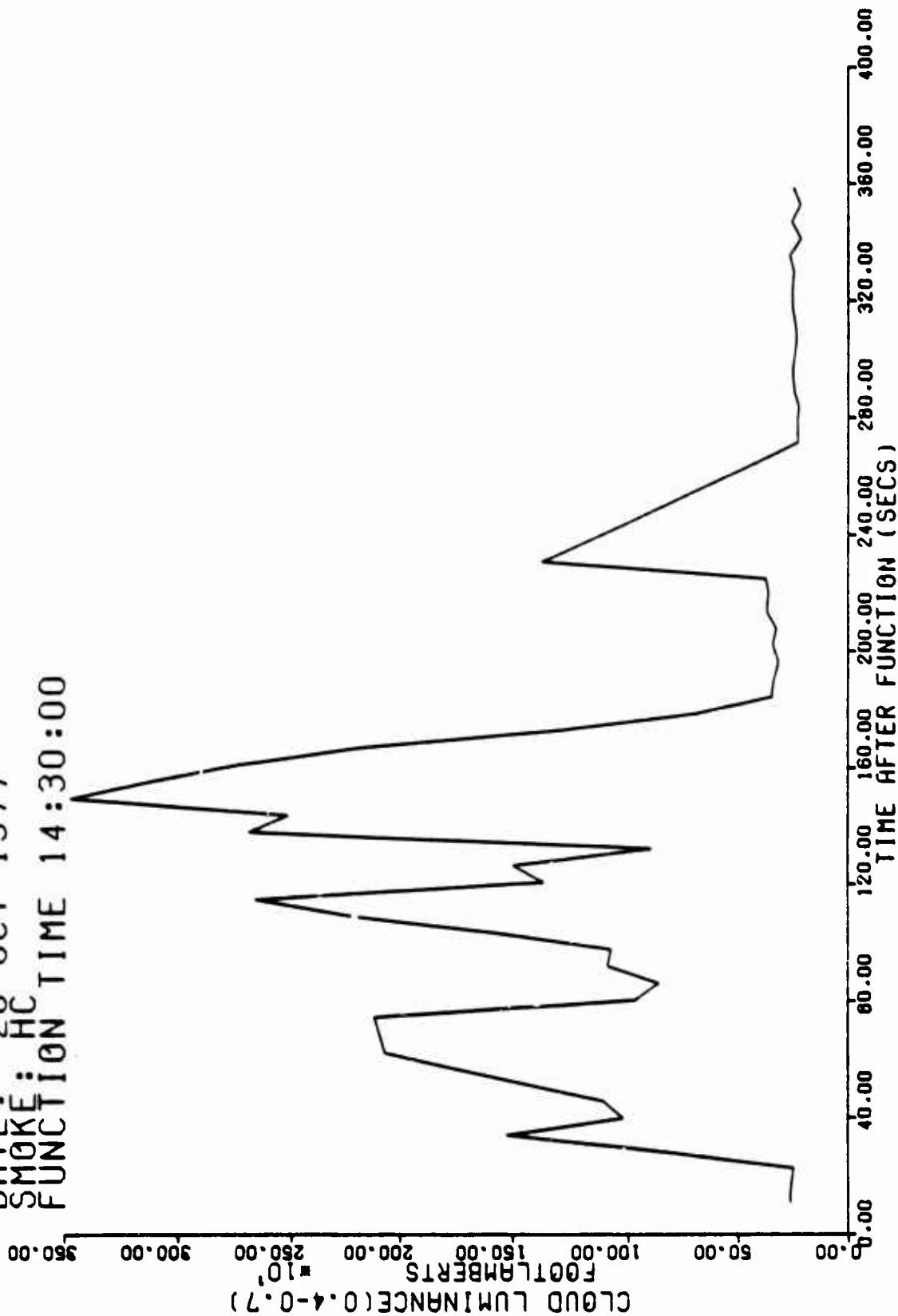
CALCULATED TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 25 (DP-1002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 14:30:00



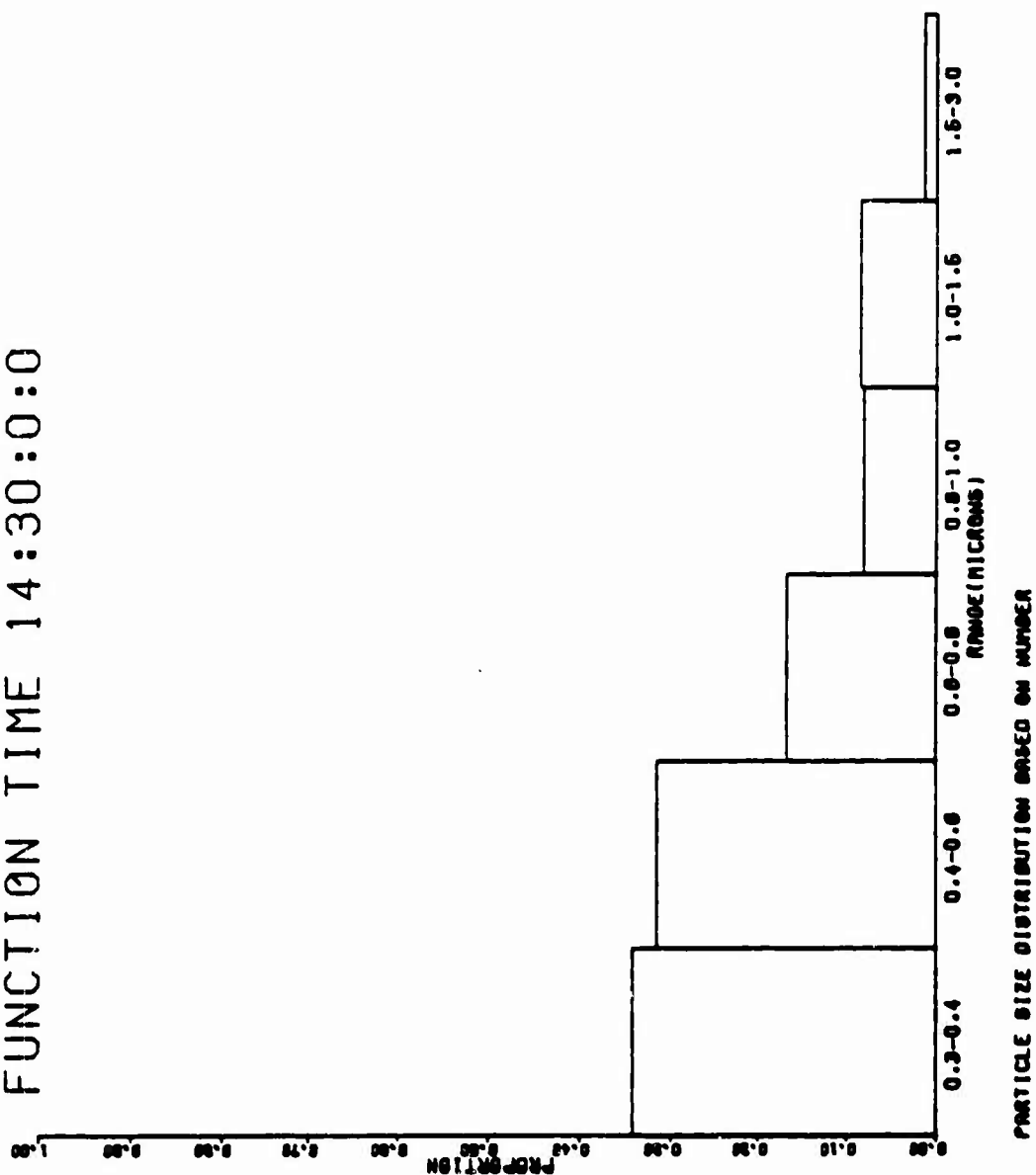
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW C

TRIAL 25 (DP-1002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:30:00

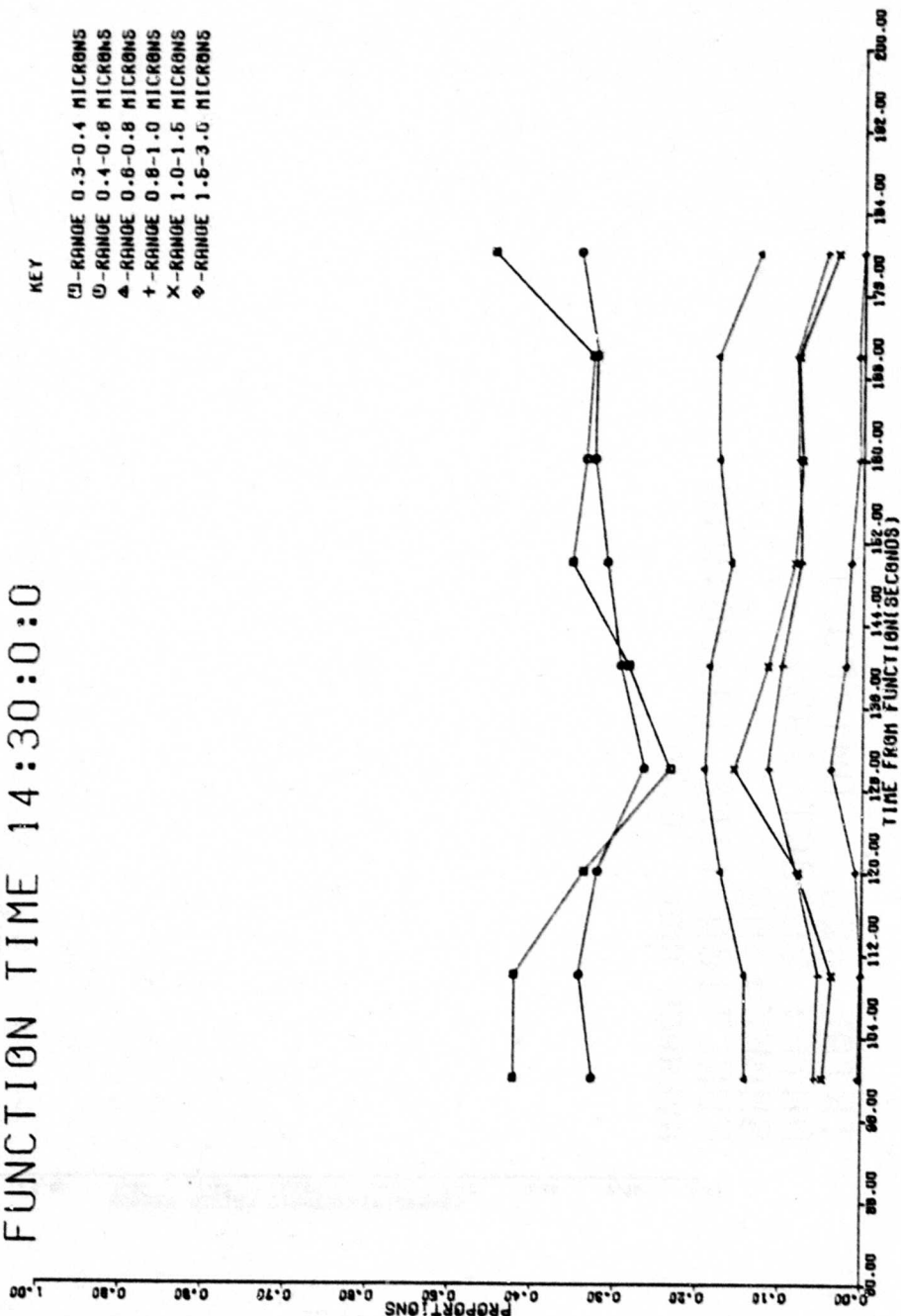


CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #25 (D01-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:30:0:0

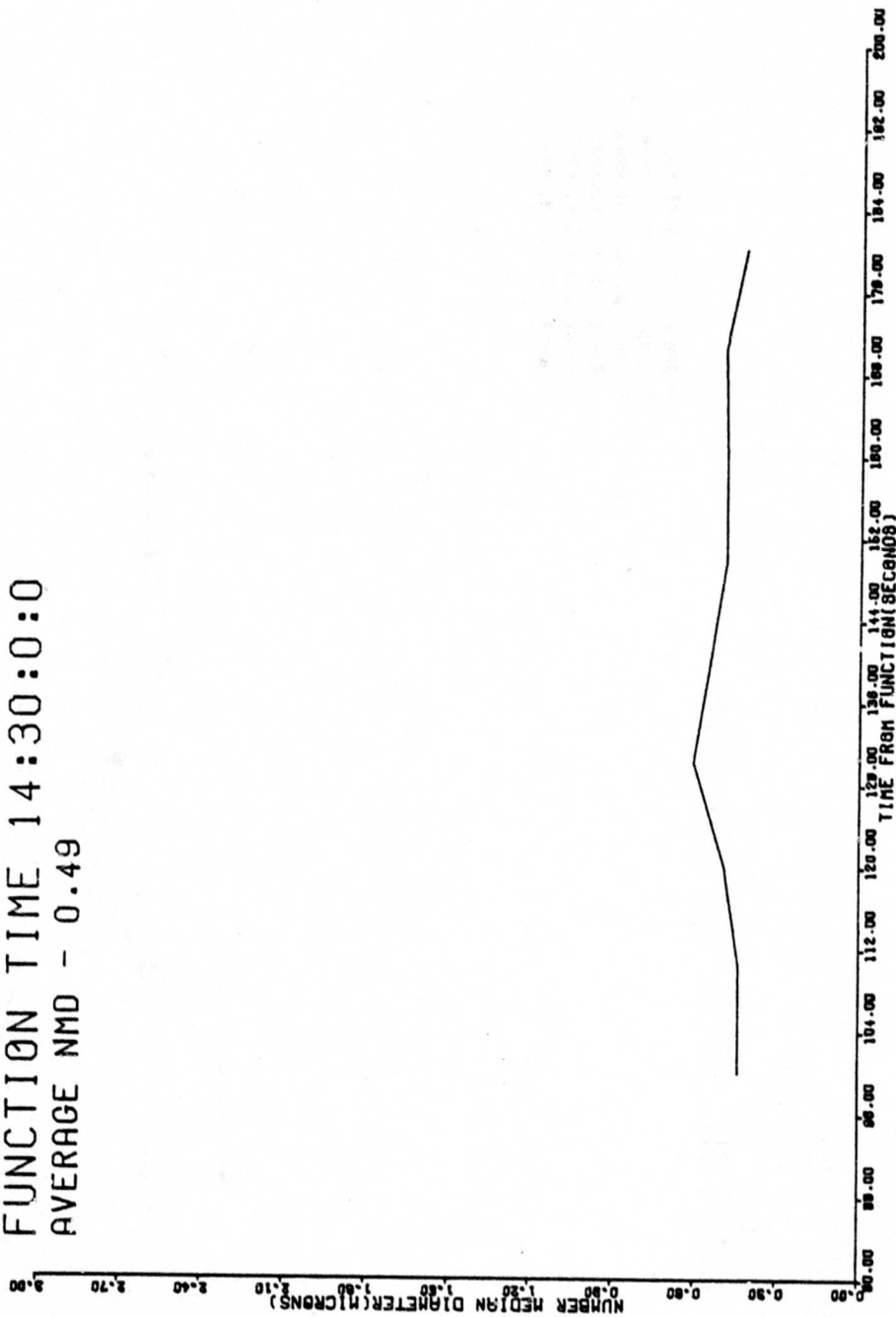


TRIAL #25 (D01-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:30:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #25 (D01-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 14:30:0:0
 AVERAGE NMD - 0.49



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-18

TRIAL DP1-002-T-26 (HC SMOKE) 26 OCT 1977

SUMMARY OF TEST DATA	B-I-18-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-18-5
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-18-6
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-18-7
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-18-18
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-18-19
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-18-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-18-21
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-18-22
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-18-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-18-24
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-18-25
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-18-26
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-18-27
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-18-28

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-18-29
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-18-30
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-18-31
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-18-32

SUMMARY OF TEST DAY DATA

Trial: DPl-002 #26

Date: 26 Oct 77

Time: 1324:20 MDT

Wind Direction (Transport) (degrees) (4m)	173
Mean Wind Speed (Transport) (\bar{u} , m/sec)	4.0
Temperature of 2-meters, Trial Time (T , $^{\circ}\text{C}$).....	25.4
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	10.0
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m).....	6.1
Temperature Gradient, 0.5-8m (ΔT , $^{\circ}\text{C}$).....	-1.6
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.08
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	18.0
Solar Azimuth (deg)	182.7
Solar Altitude (deg)	37.2
Air Density - ρ (kg m^{-3})	1.008
Solar Radiation (Langleys per minute)	0.843
Barometric Pressure (millibars)	866.9
Visibility (km)	137
Reflectivity, OD Target	0.18
Haze (footlamberts)	70
Brightness, Background (footlamberts)	900
Brightness, White Target (footlamberts)	1478
Brightness, OD Target (footlamberts)	350
Percent Opaque Cloud Cover	0

Munitions/Submunitions Used (HC, 155mm Canisters)	12
Number of Munitions/Submunitions Functioned	12
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.19
(0.4 - 0.6) . . . . .	.21
(0.6 - 0.8) . . . . .	.17
(0.8 - 1.0) . . . . .	.14
(1.0 - 1.5) . . . . .	.16
(1.5 - 3.0) . . . . .	.13
$\text{Log}_{10} \text{NMD}$	-.15016
$^3\text{Log}_{10} \text{NMD}$ . . . . .	.26738
NMD . . . . .	.71
MMD	1.03

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1324:20*	1	7	1
1324:30	41	43	5
1324:40	71	49	9
1324:50	113	55	11
1325:00	136	59	13
1325:10	176	63	18
1325:20	212	64	19
1325:30	252	83	22
1325:40	292	93	25
1325:50	359	96	42

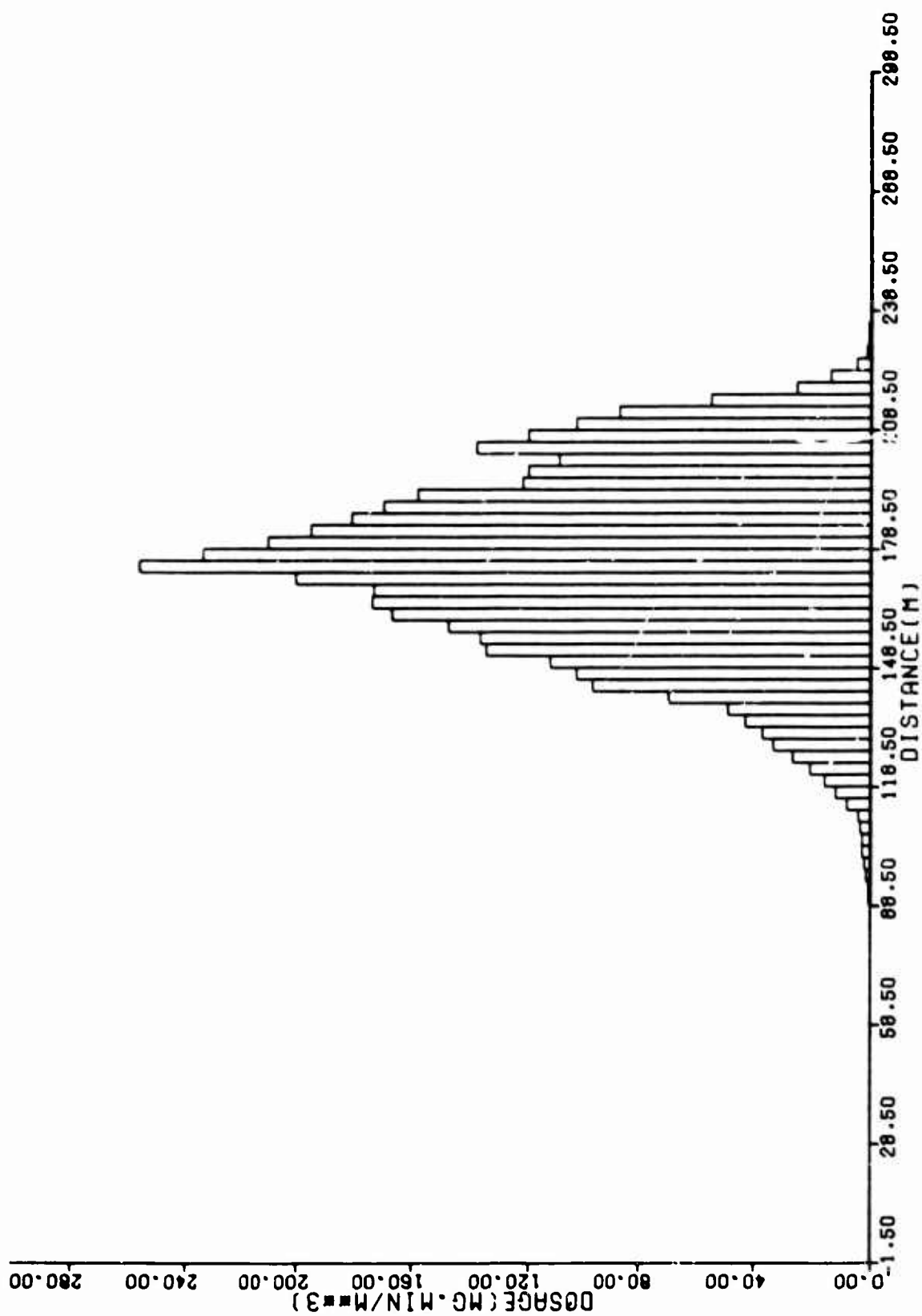
*(Not all canisters were ignited during this picture frame)

SKY BRIGHTNESS

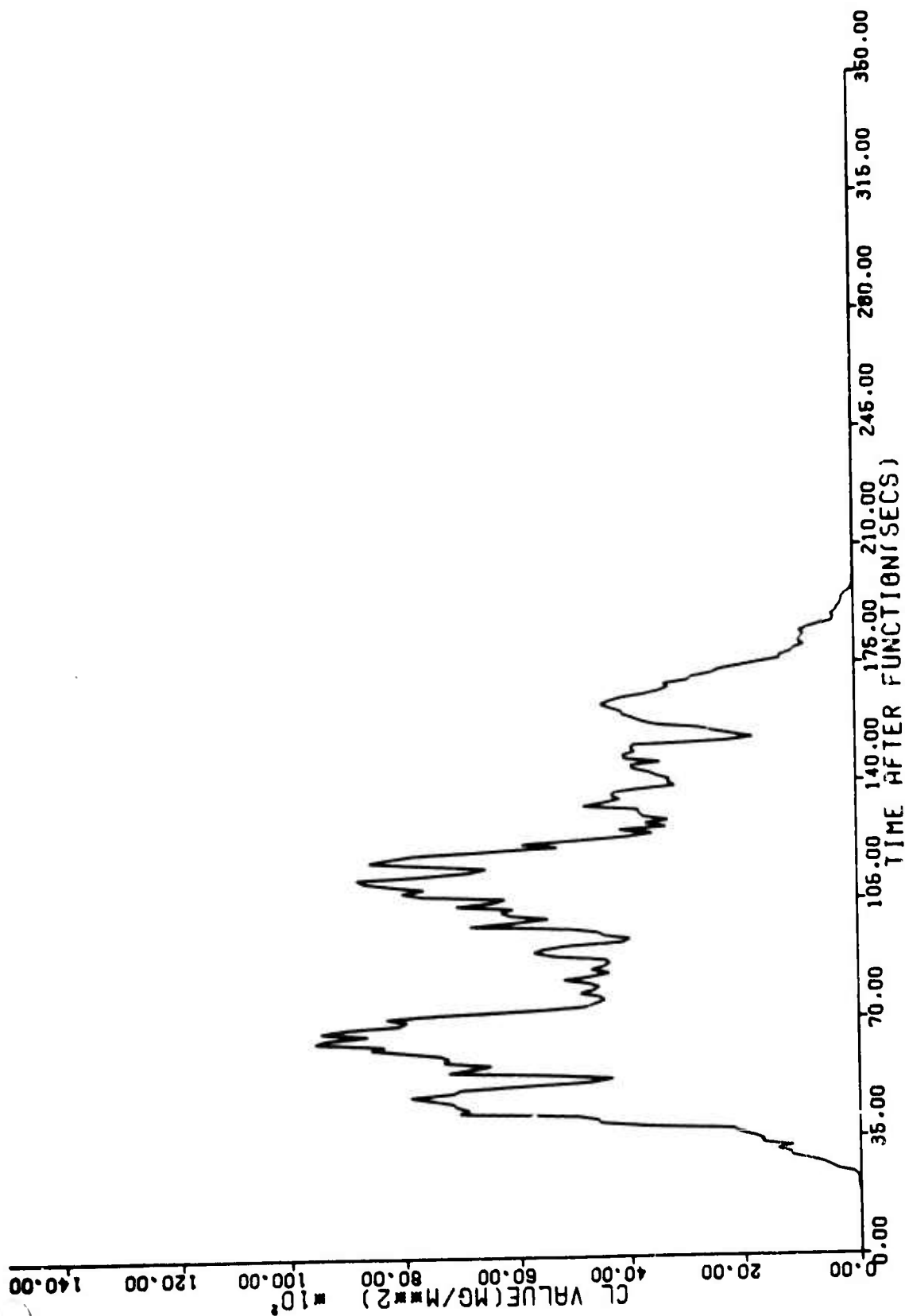
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	652
5	1300
10	1300
15	1300
20	1140
25	1140
30	1140
35	1140
40	1140
45	1140

Viewing azimuth 240° except 255° at 0 degrees elevation

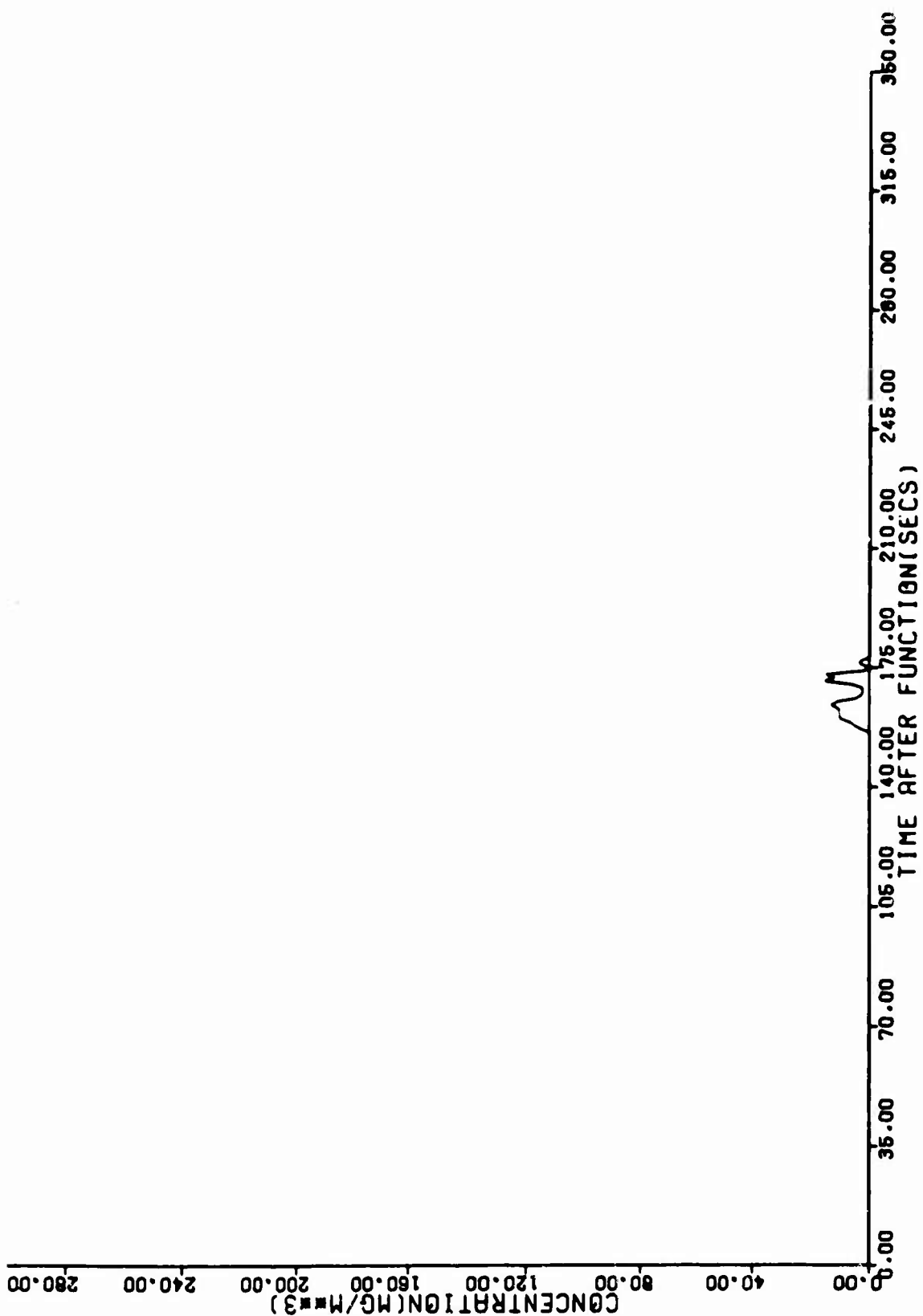


TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE



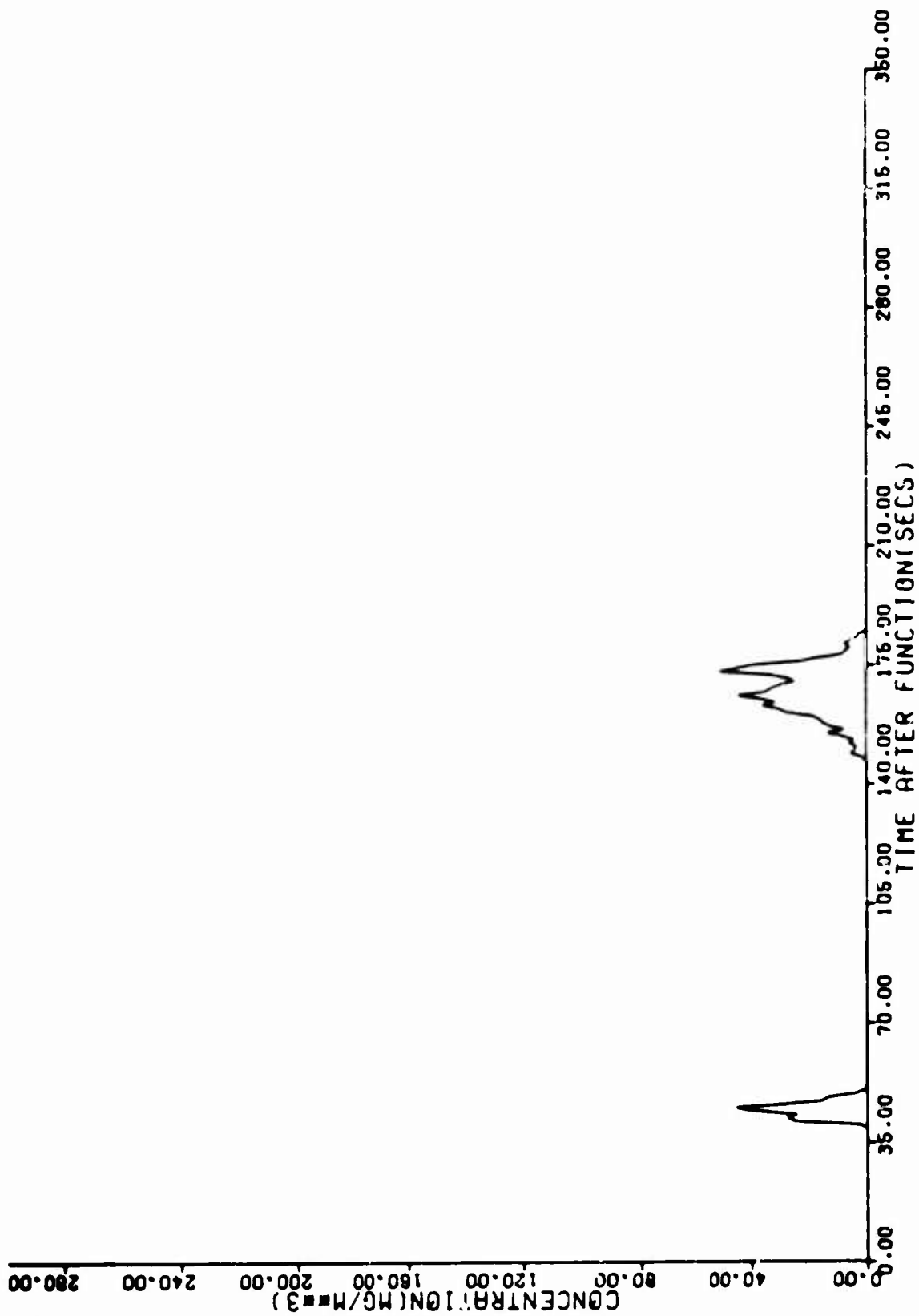
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

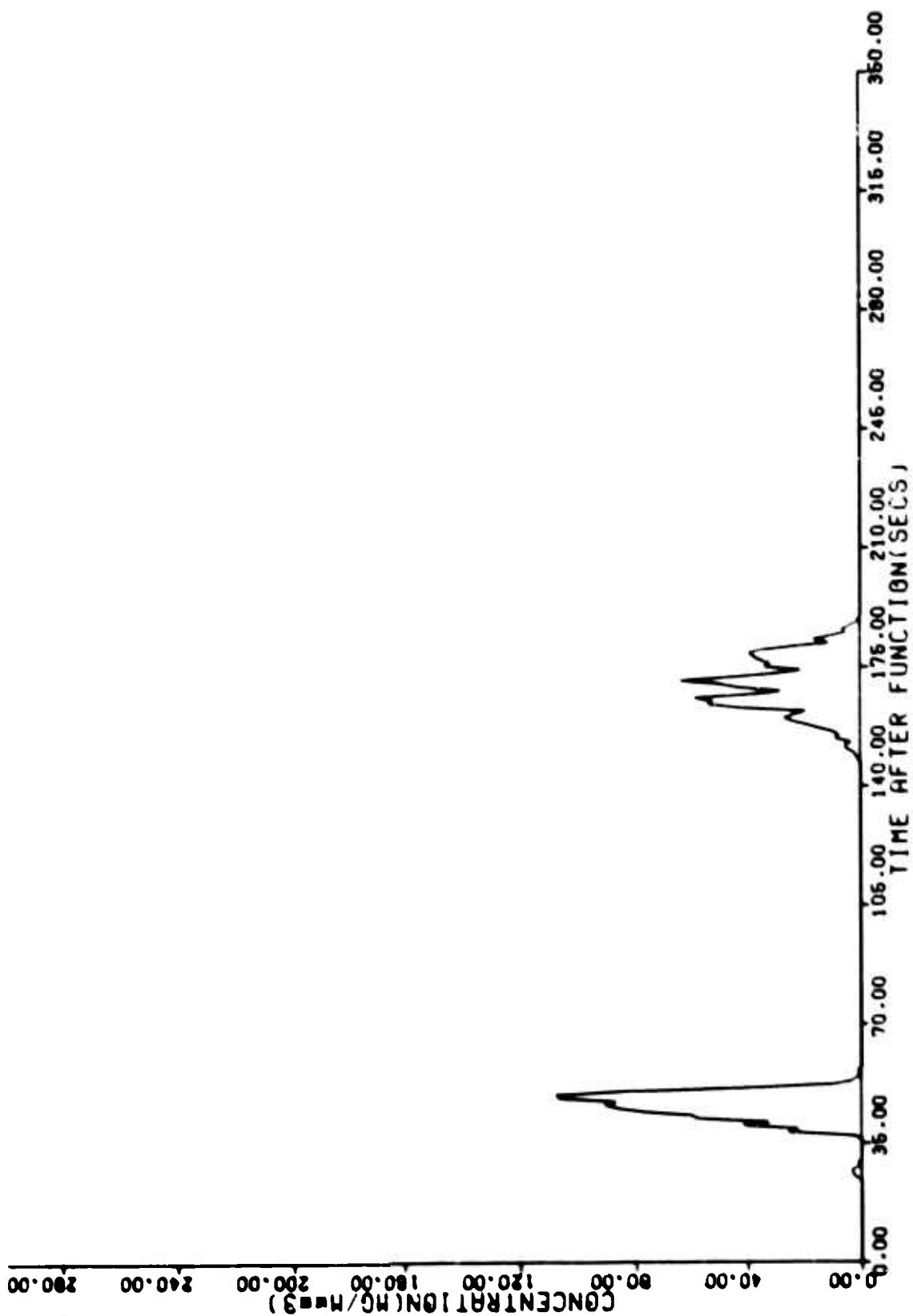
ROSOL PHOTOMETER #6, X=0.00, Y=102.00, Z=0.00



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

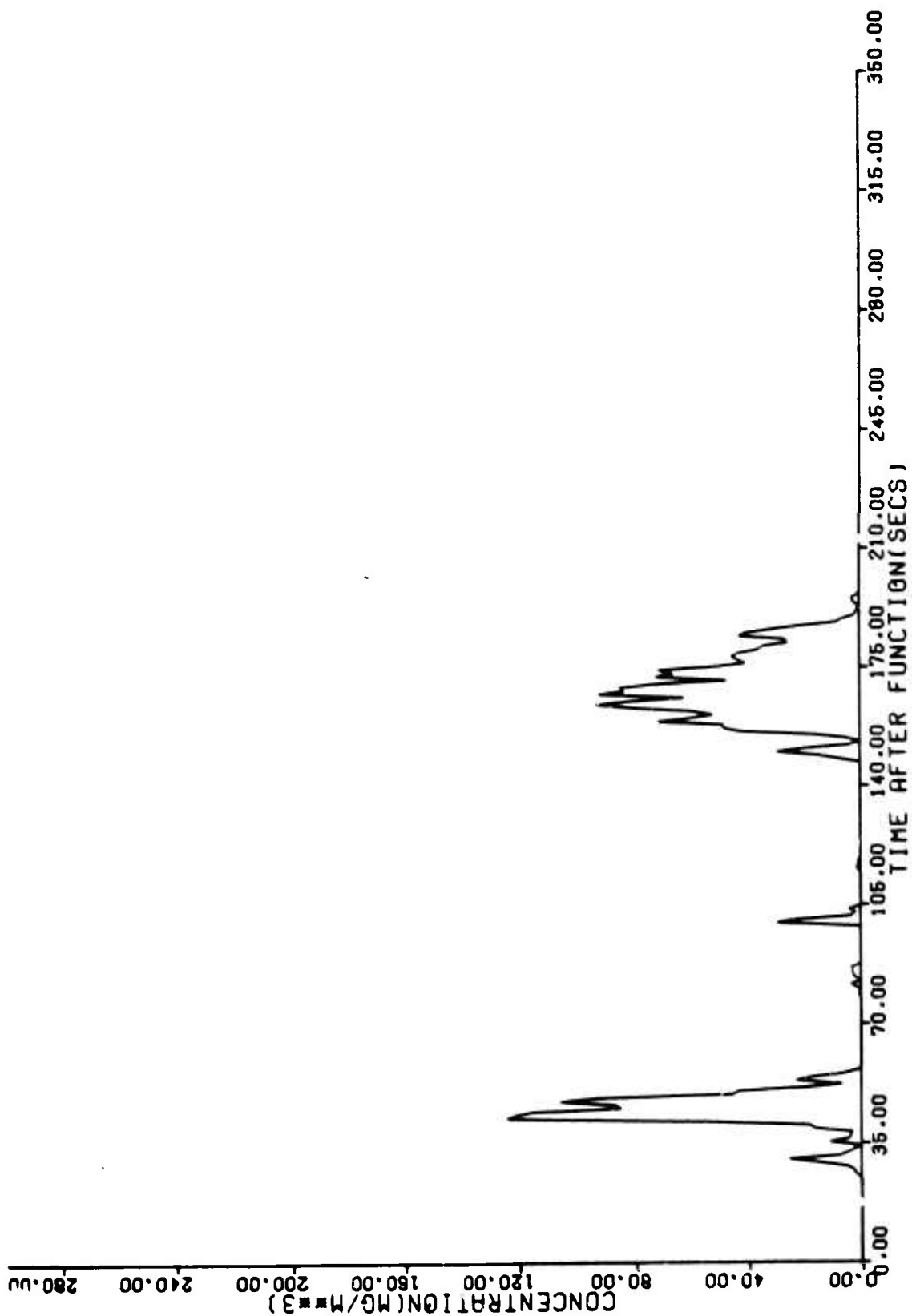
AEROSOL PHOTOMETER #7, X=0.00, Y=120.00, Z=0.00

8-1-18-9



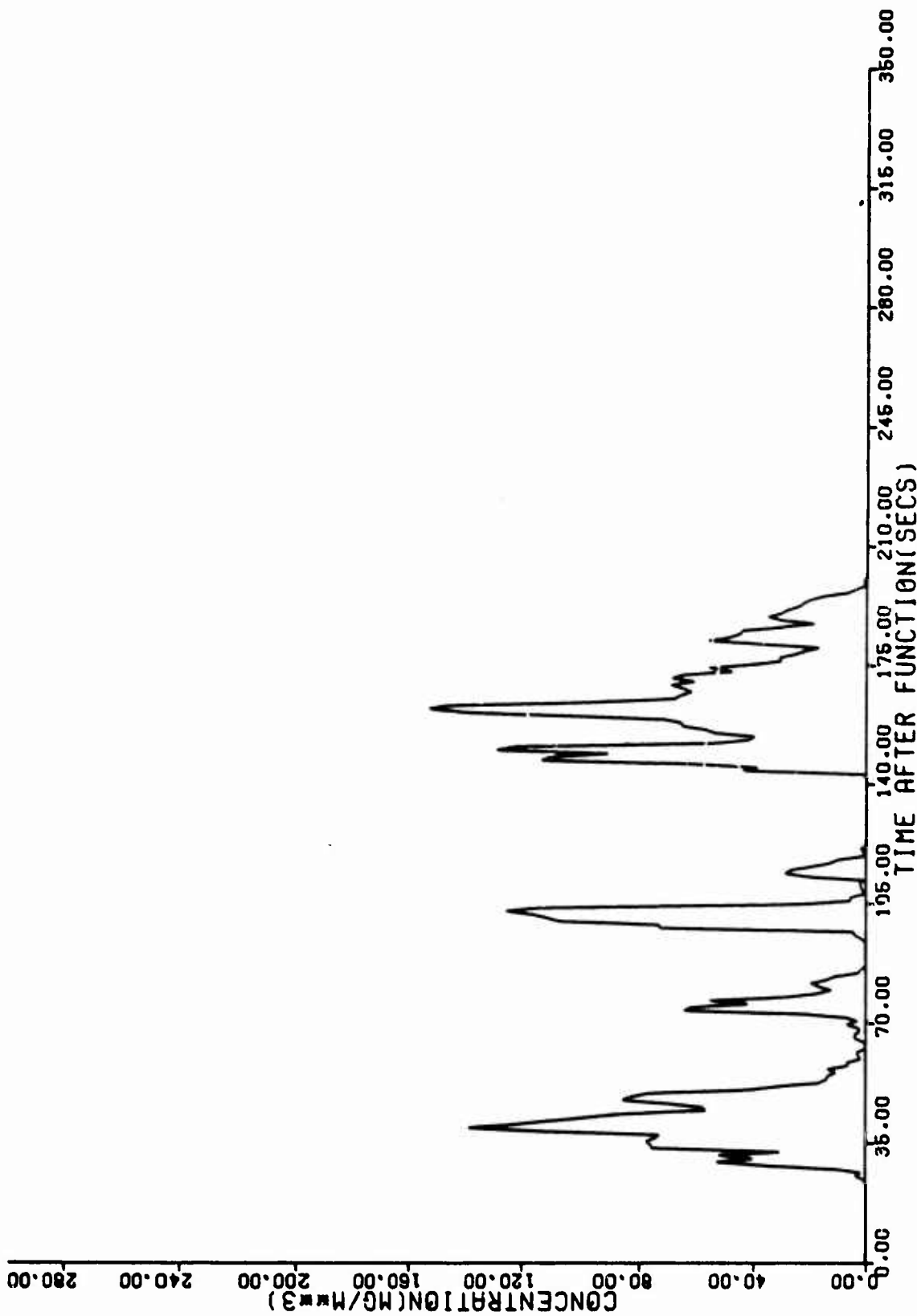
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

AEROSOL PHOTOMETER #8, X=0.00, Y=129.00, Z=0.00



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

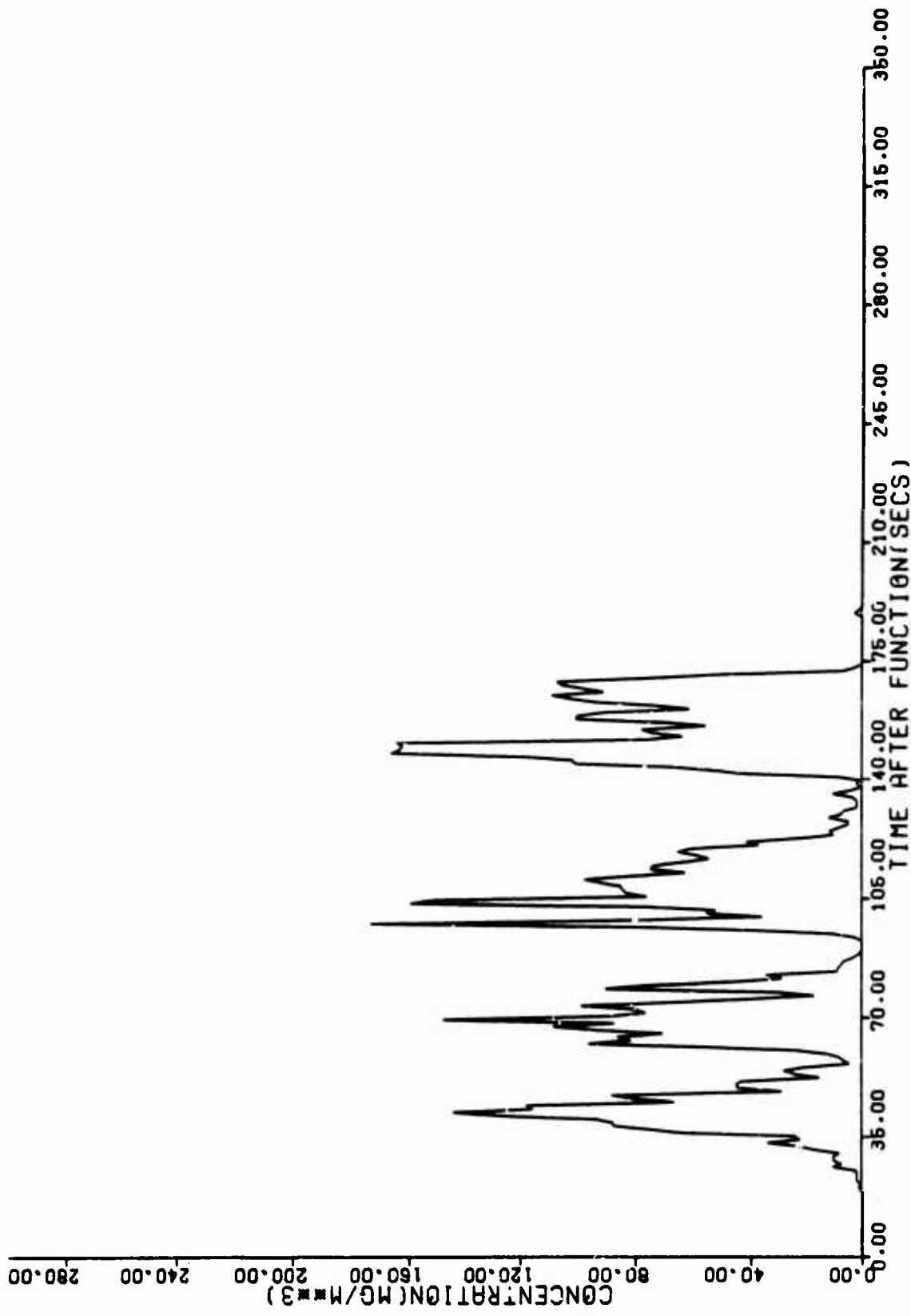
AEROSOL PHOTOMETER #9, X=0.00, Y=138.00, Z=0.00



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

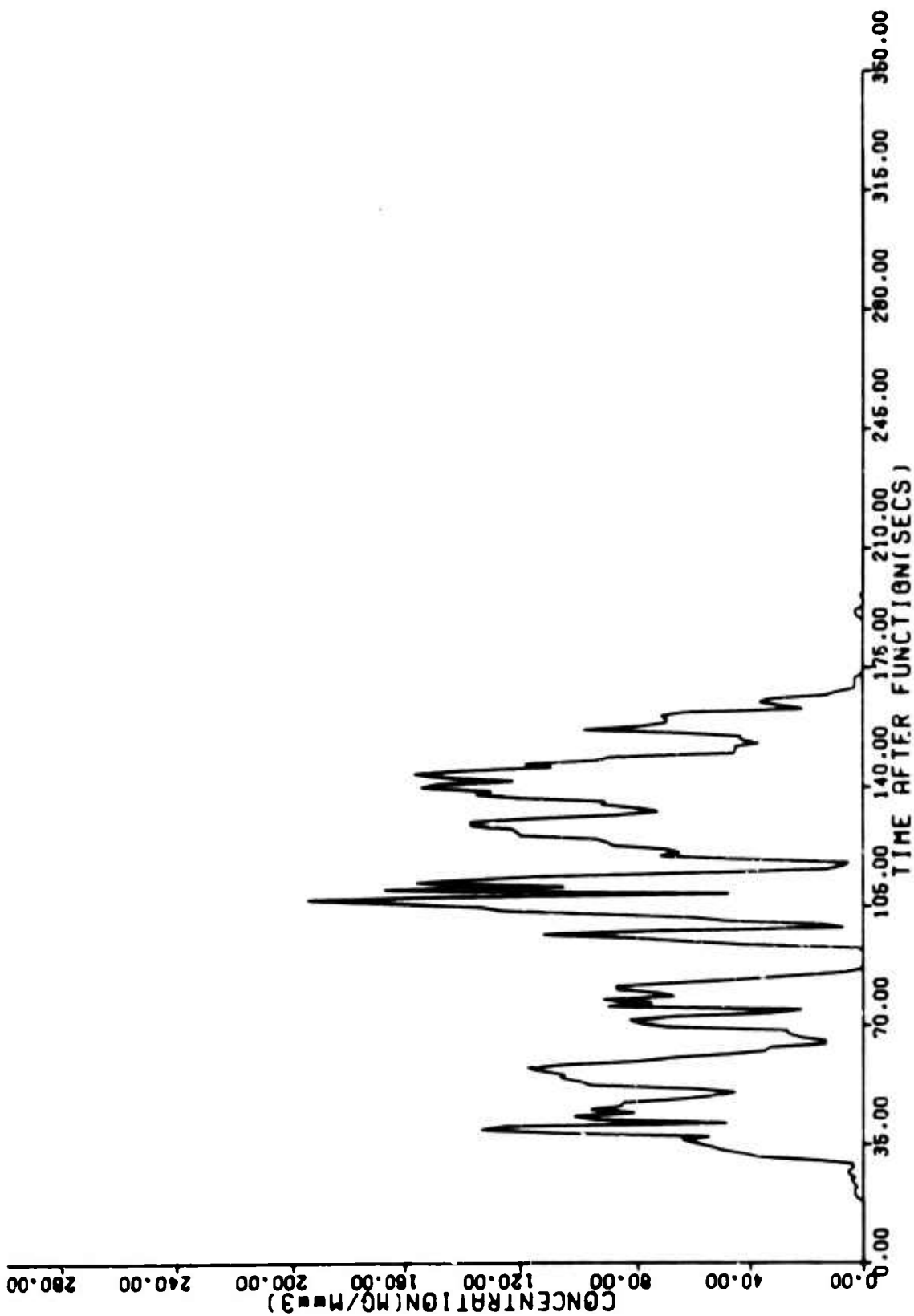
AEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00

B-I-18-2



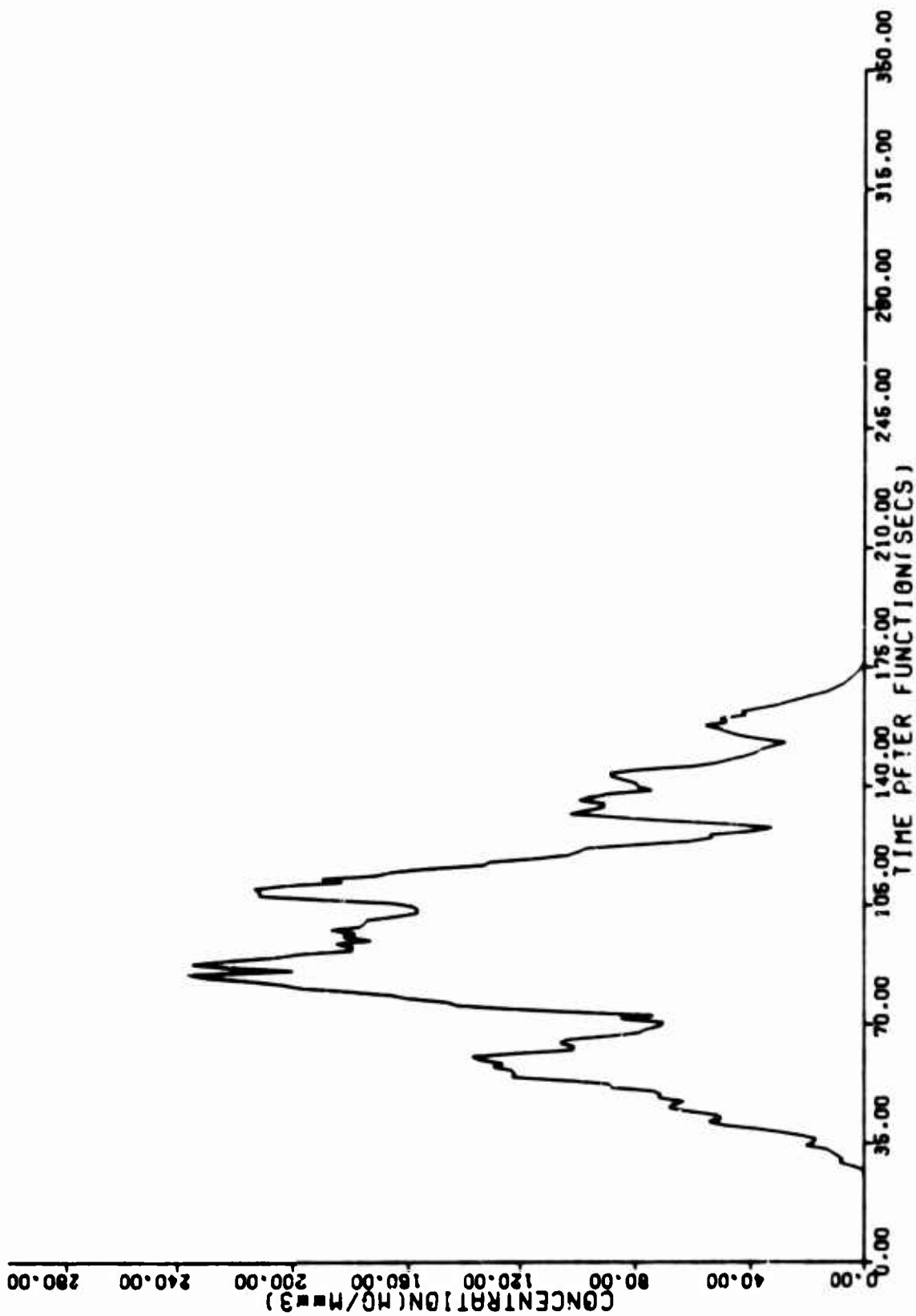
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

AEROSOL PHOTOMETER #11, X=0.00, Y=156.00, Z=0.00



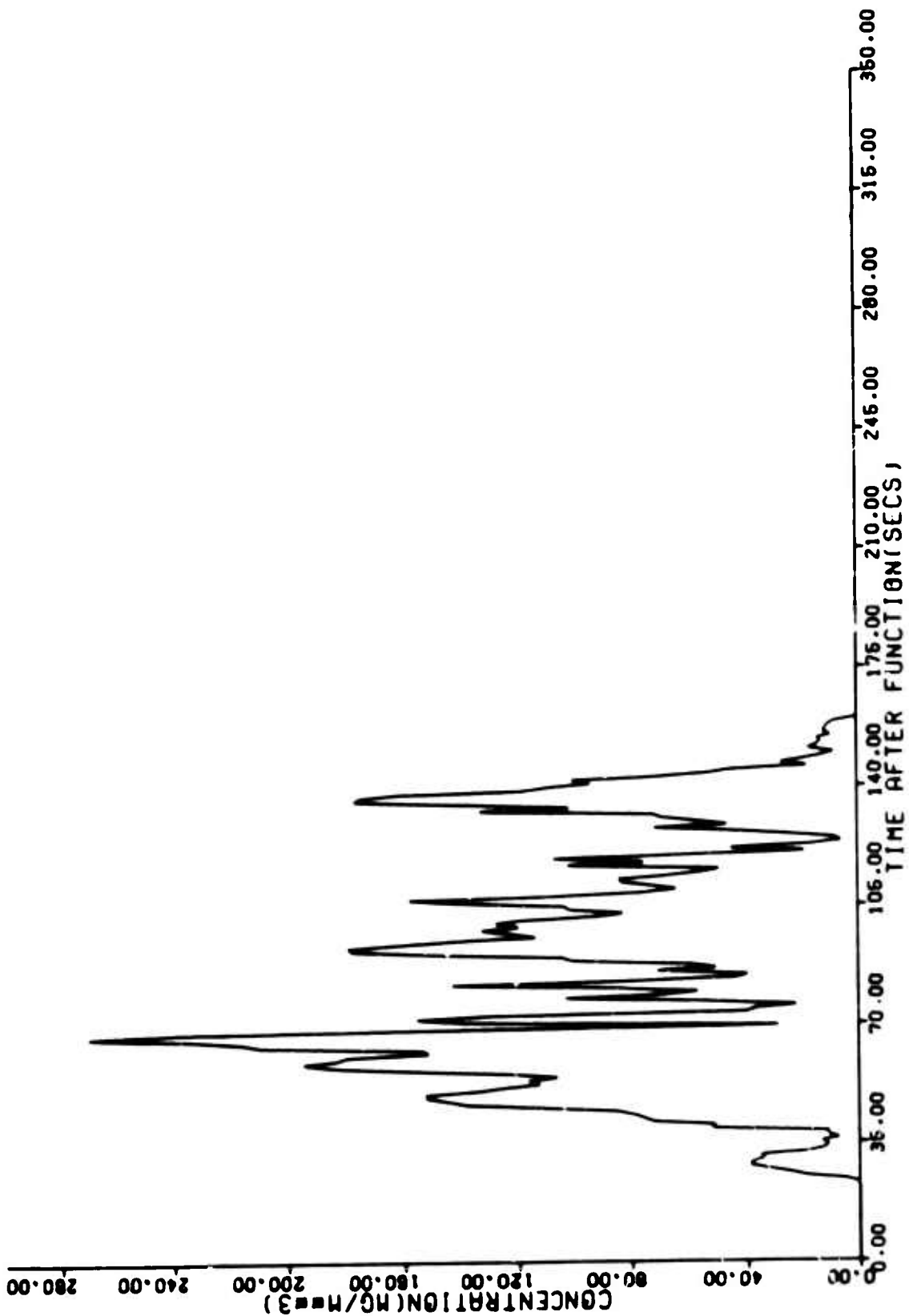
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

PEROSQL PHOTOMETER #12, X=0.00, Y=165.00, Z=0.00



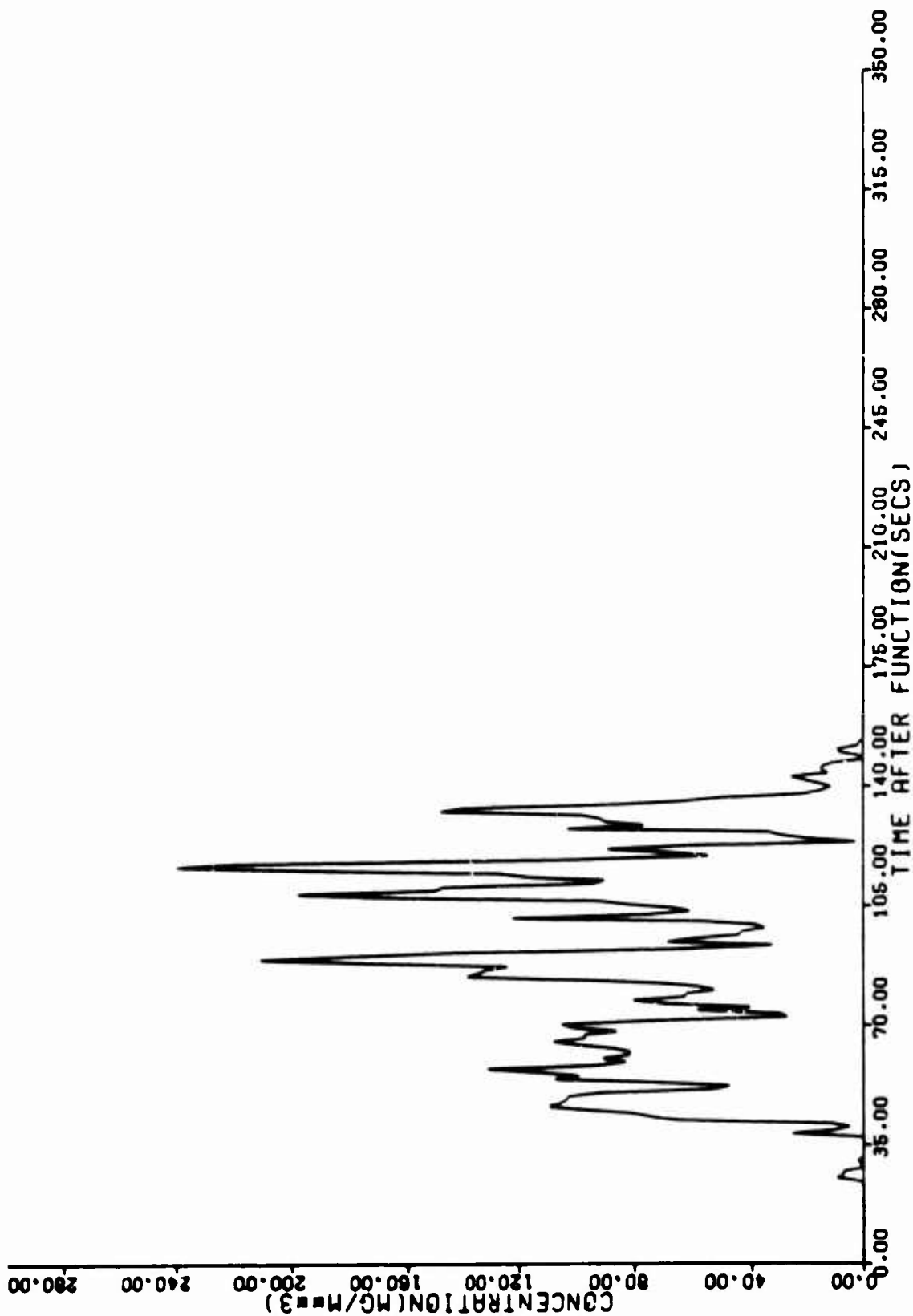
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

AEROSOL PHOTOMETER #13, X=0.00, Y=174.00, Z=0.00



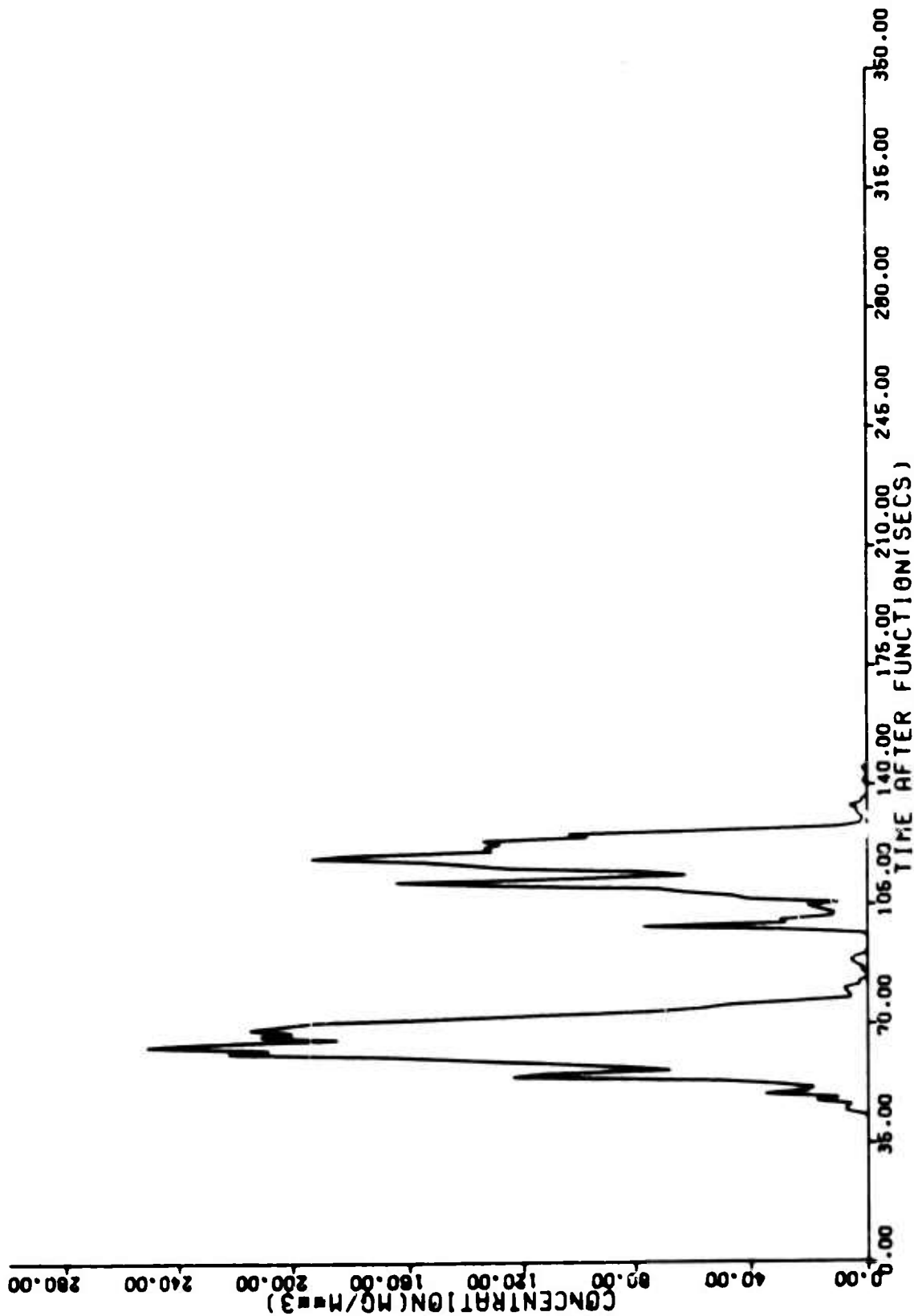
TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

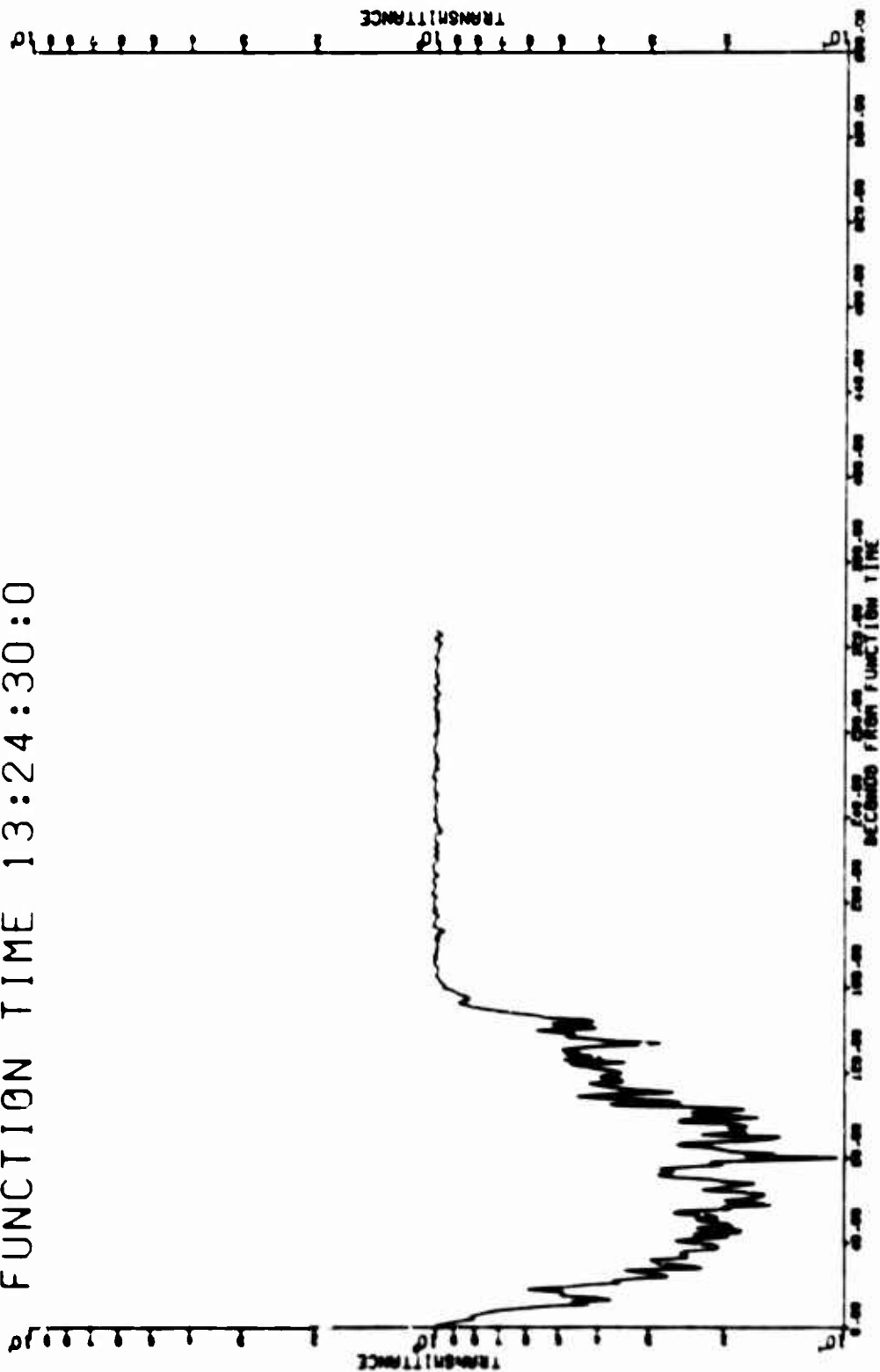
AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00



TRIAL 26 (DP-1002), 26 OCT 1977, 13:24:30, HC SMOKE

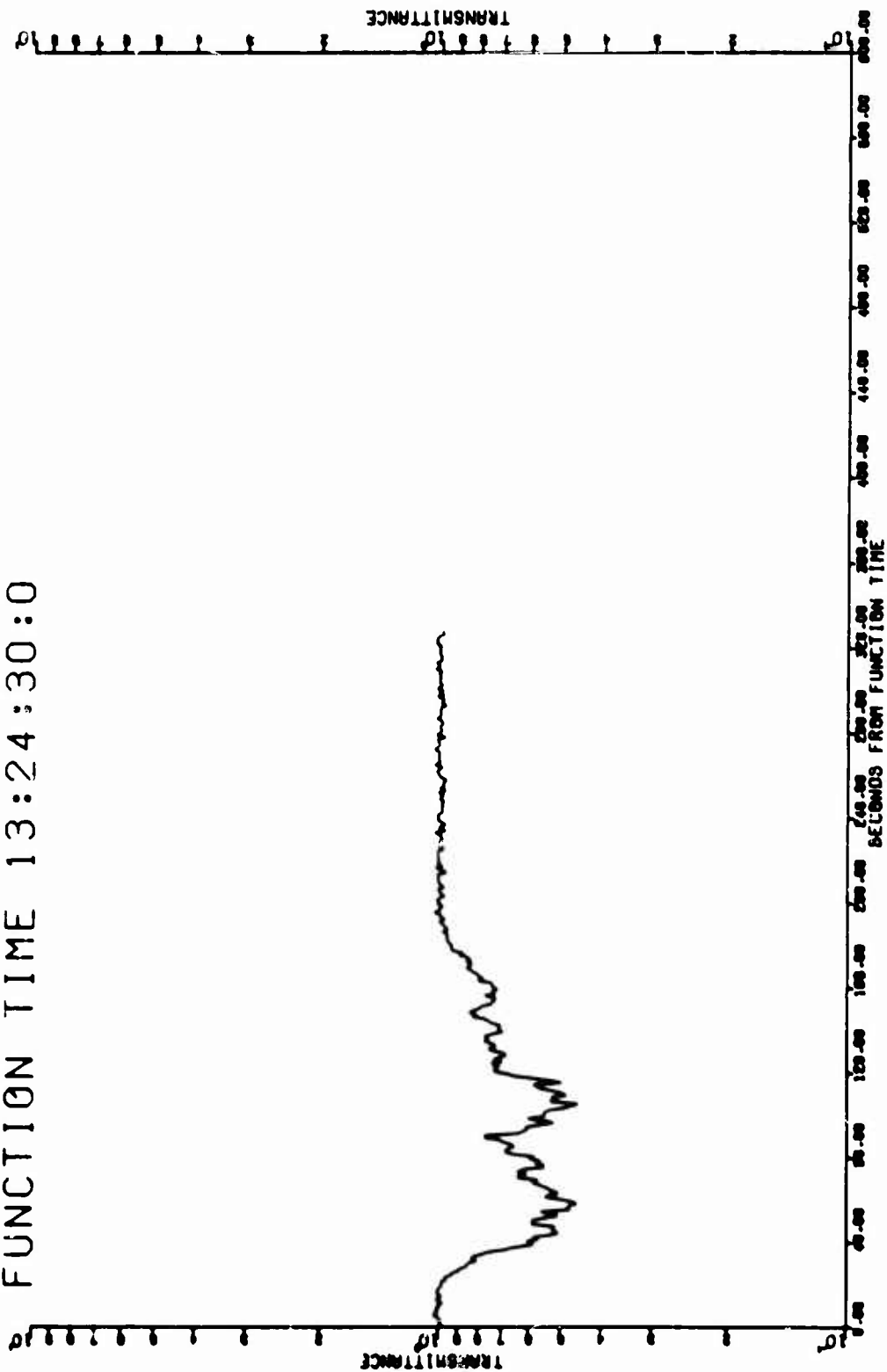
AEROSOL PHOTOMETER #16, X=0.00, Y=210.00, Z=0.00

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



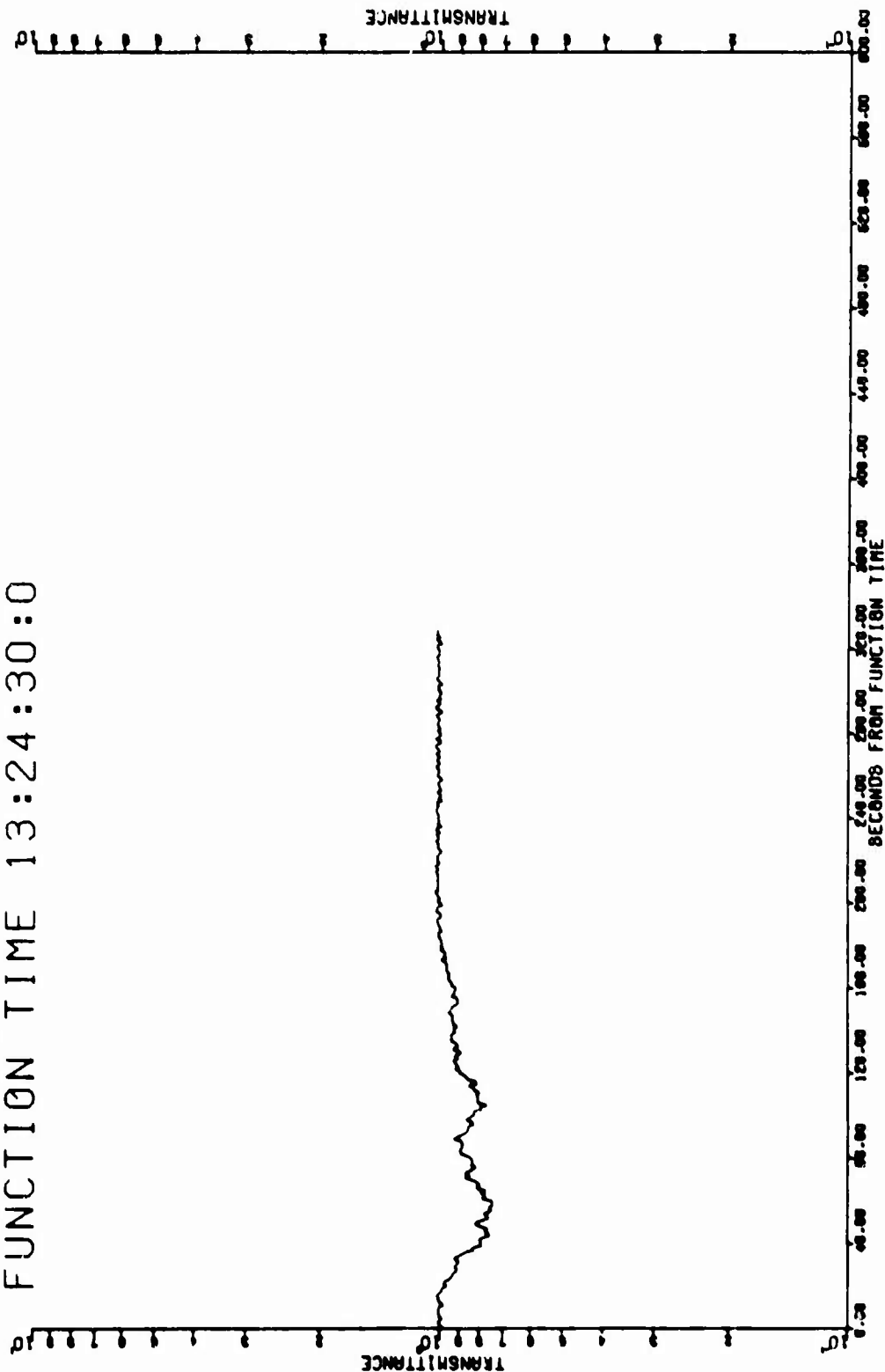
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



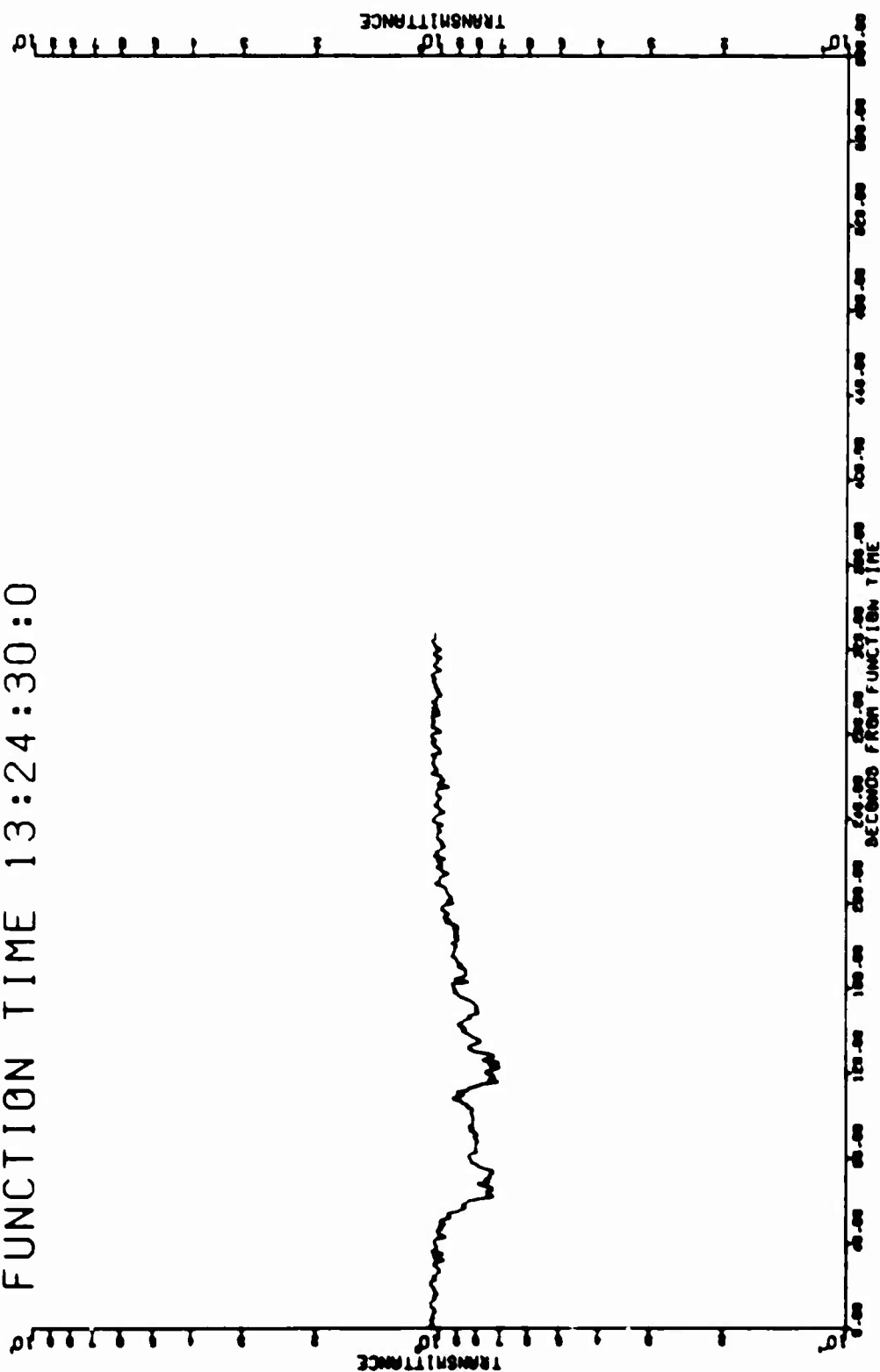
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



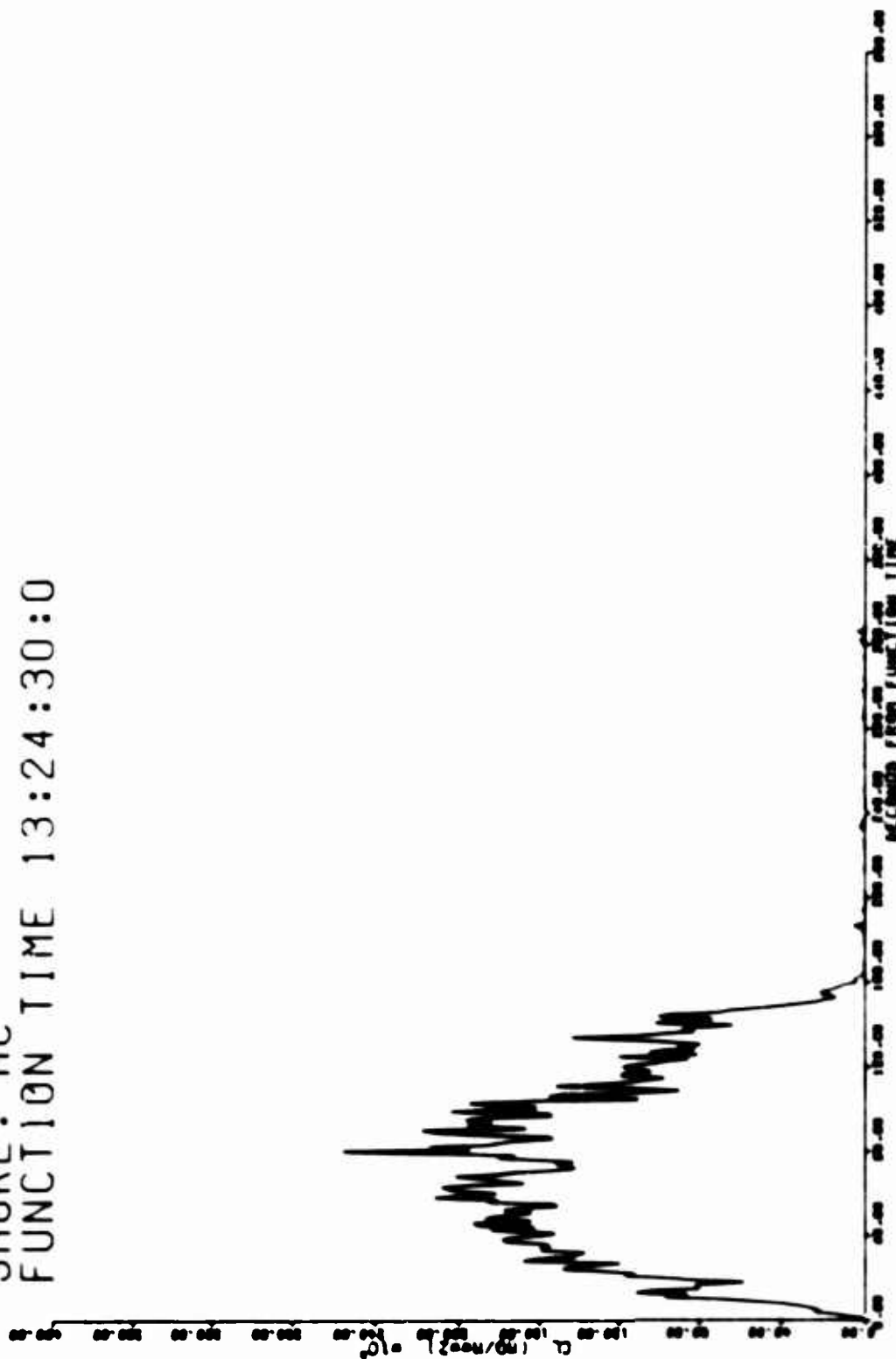
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



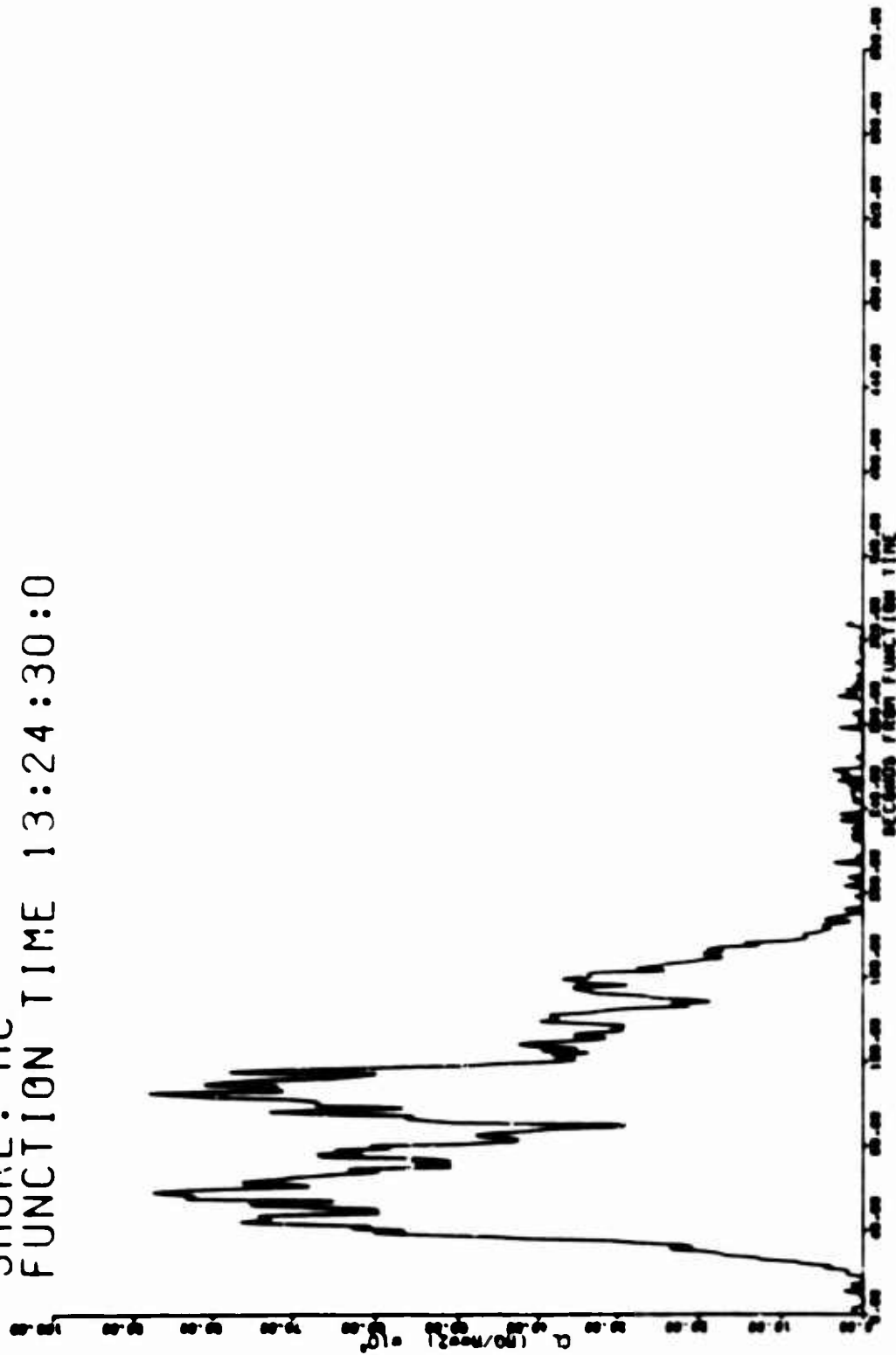
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #26 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30:0



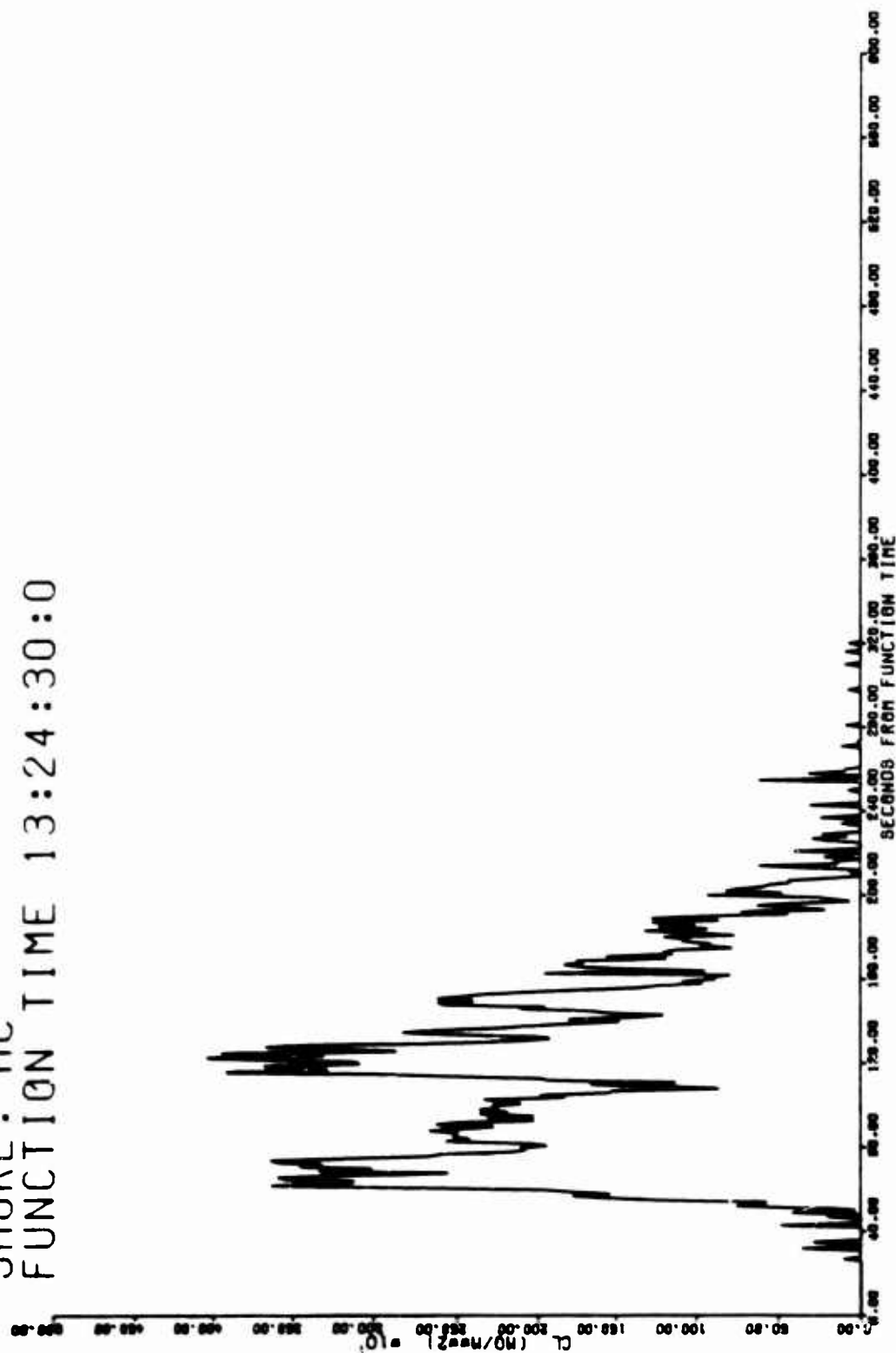
CL VALUES VERSUS TIME FOR ROW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #26 (DP1-002)
 DATE: 25 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30:0



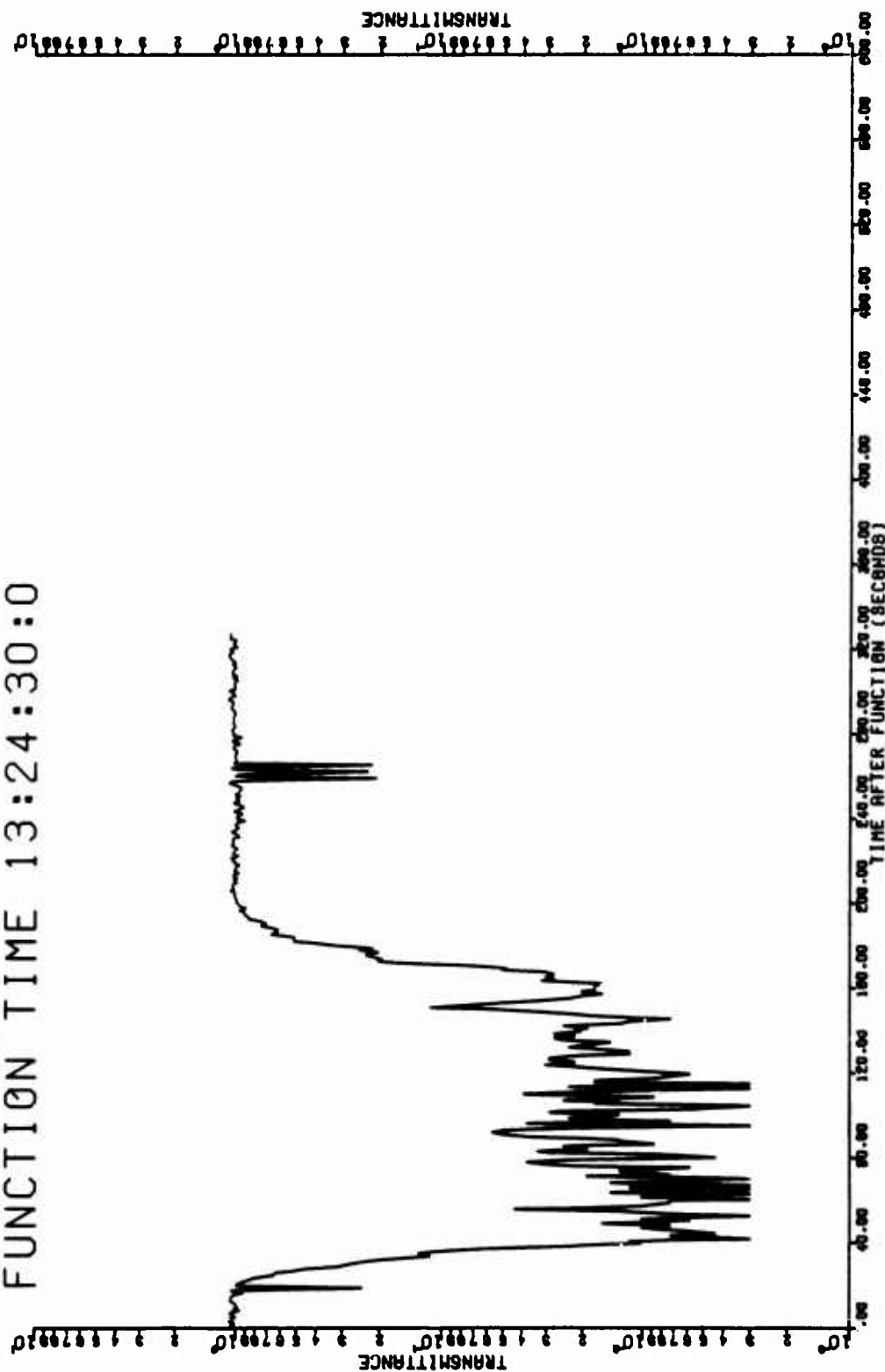
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



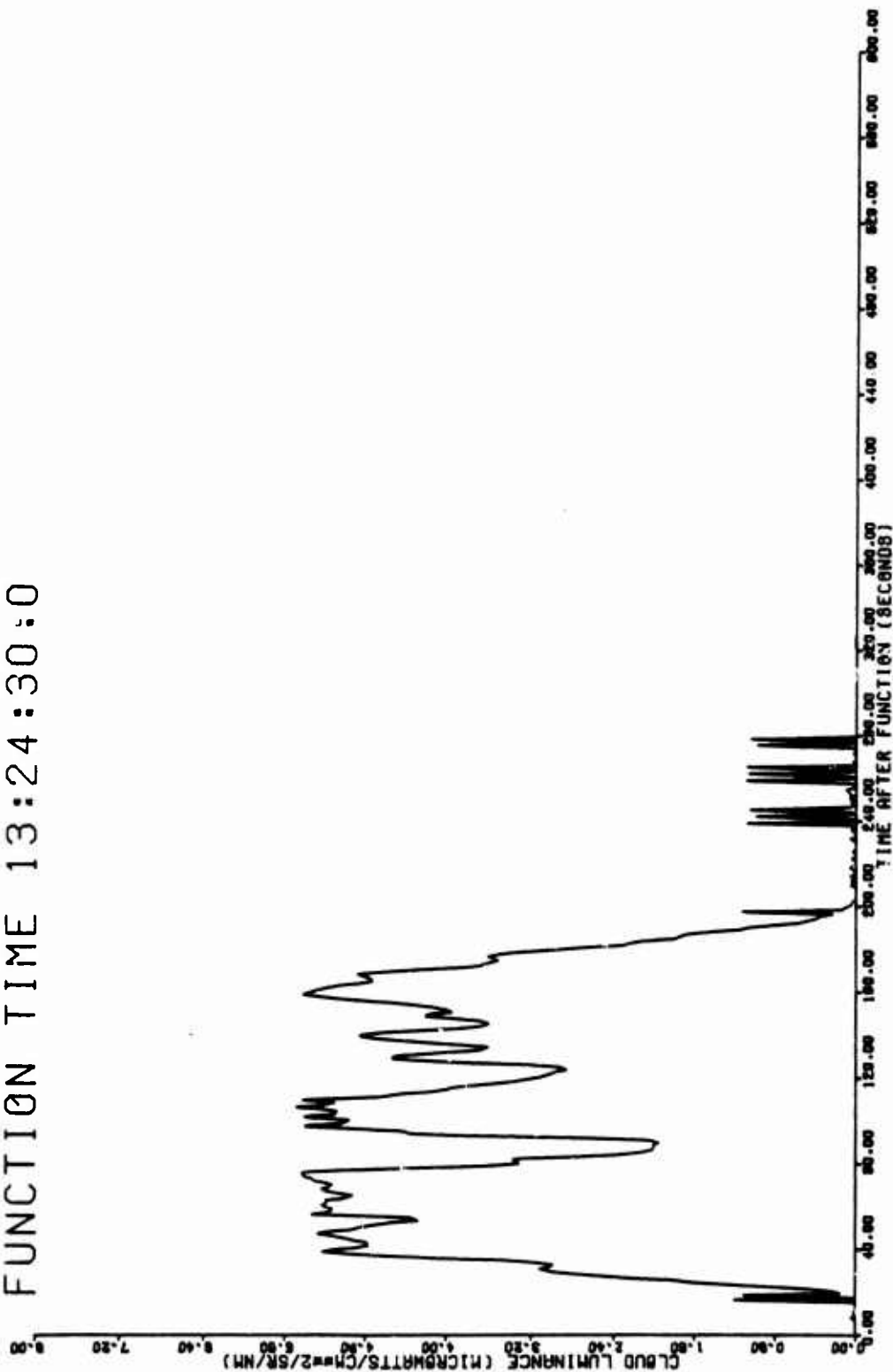
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #26 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30:0



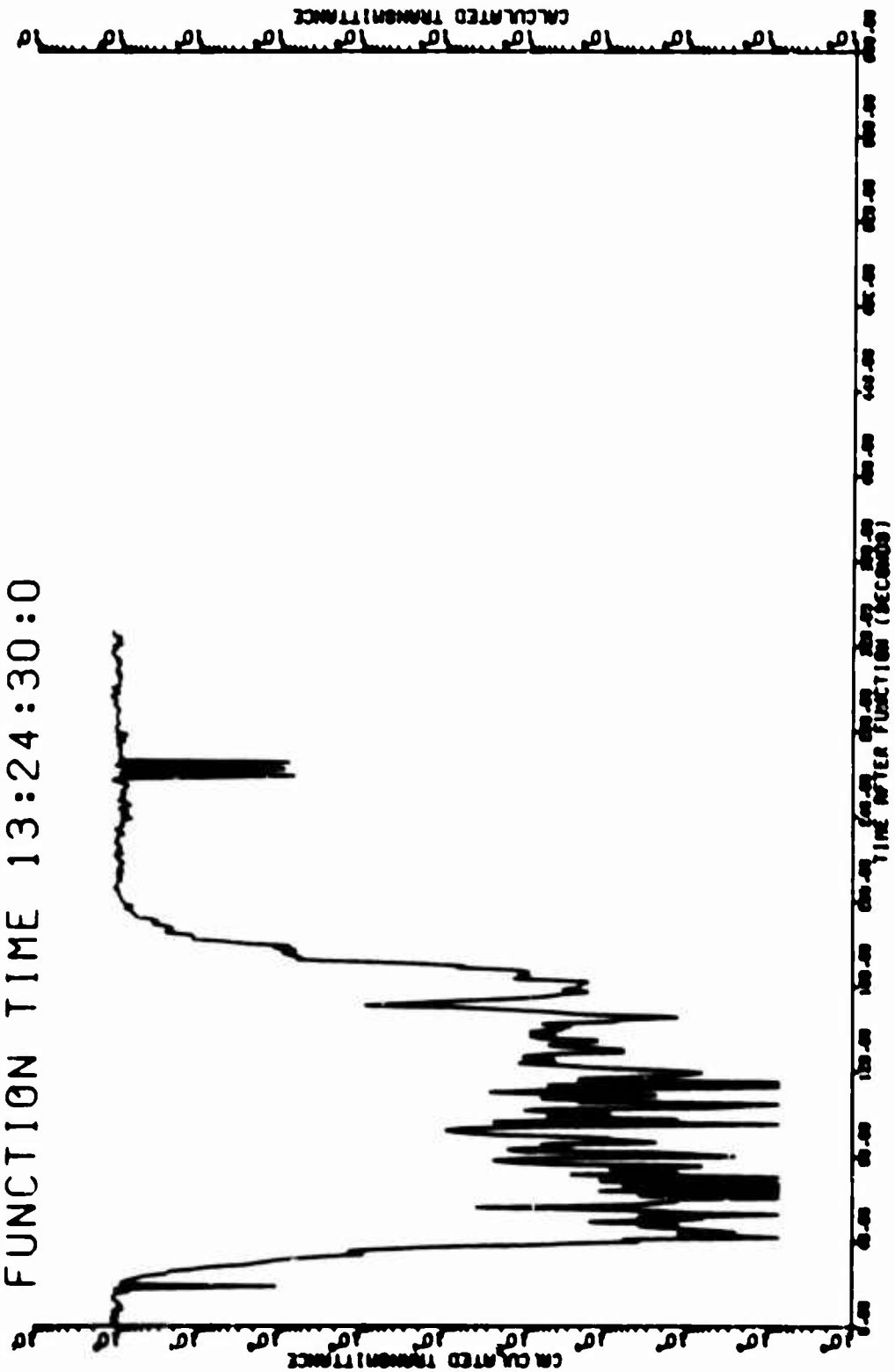
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



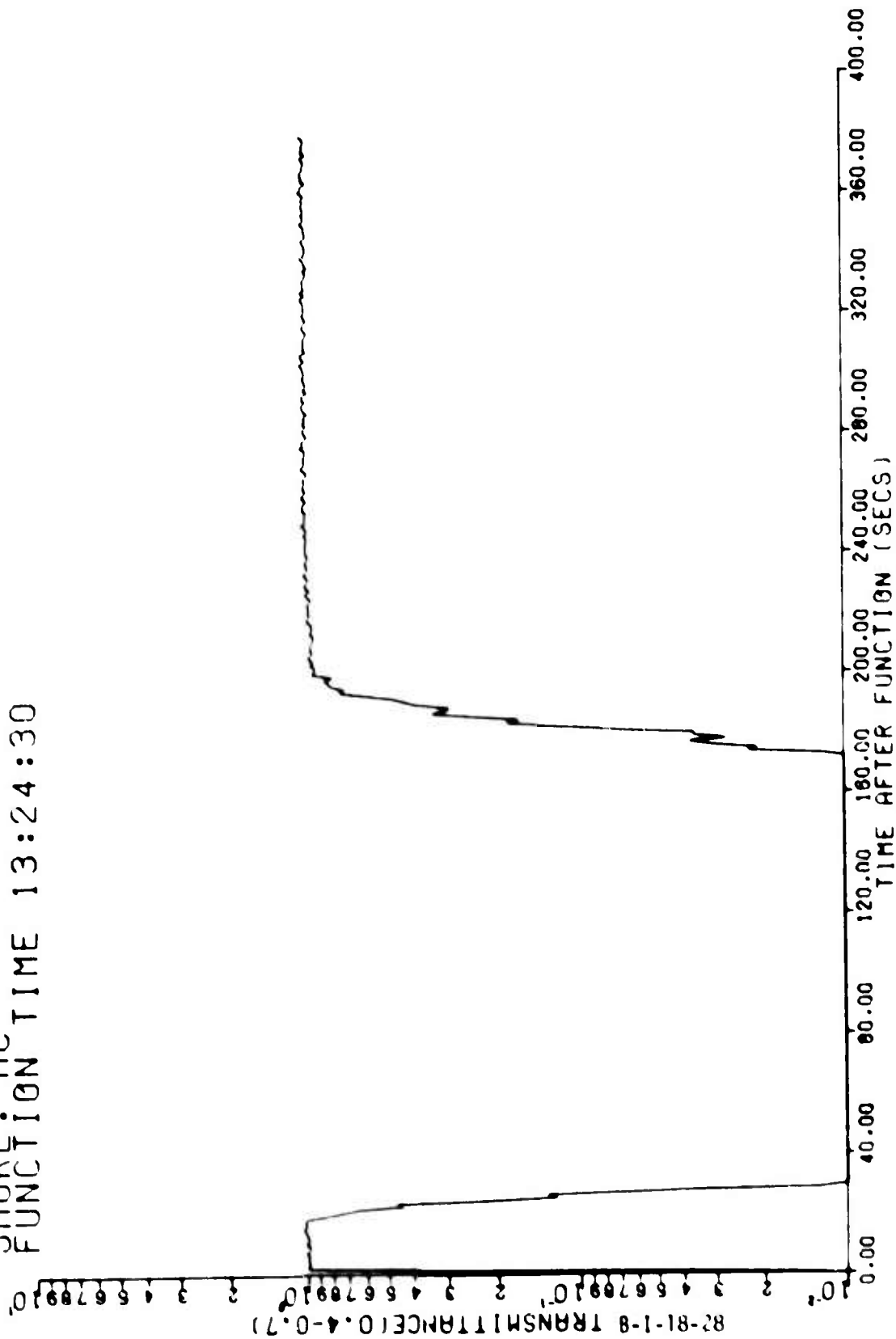
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



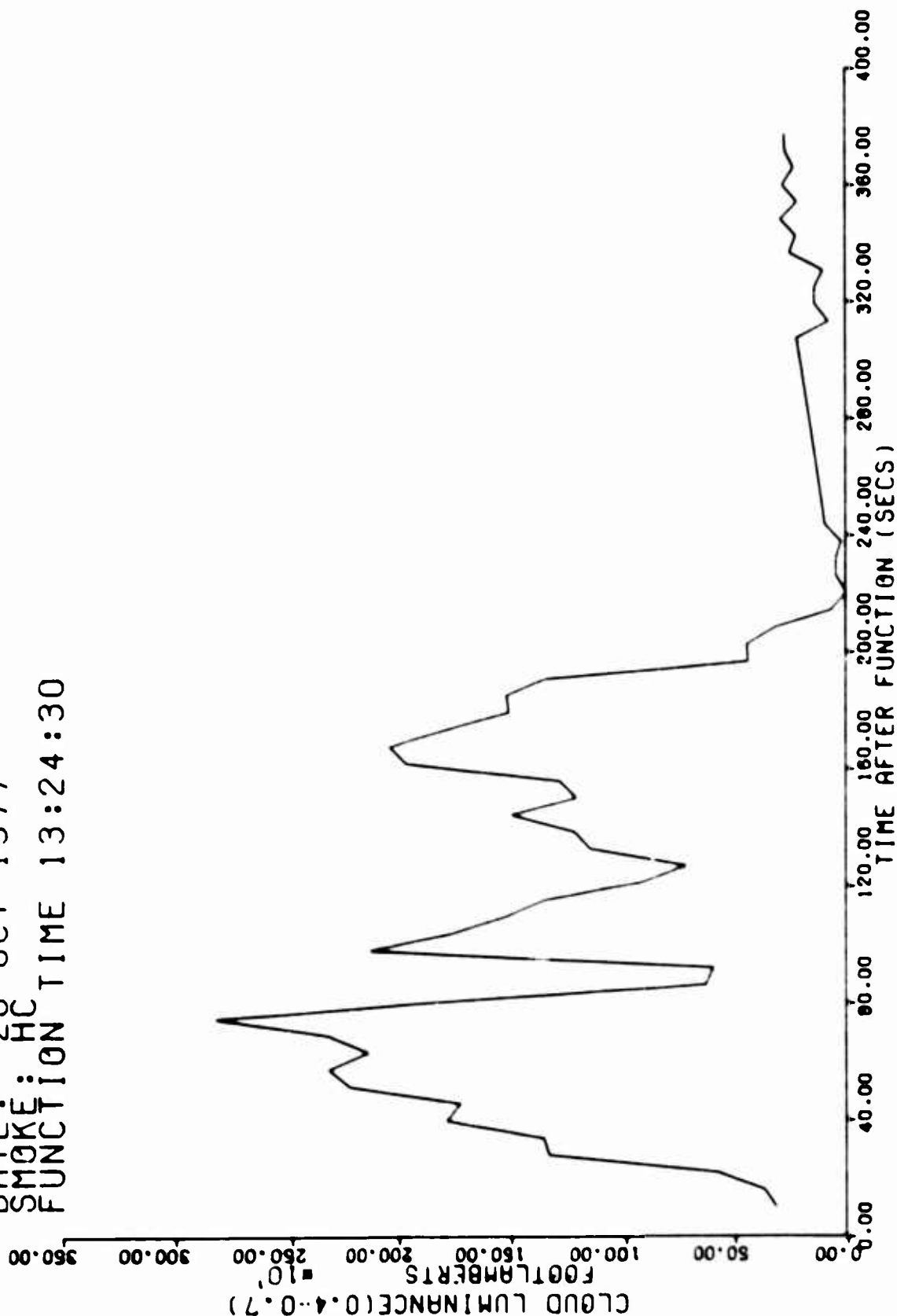
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 26 (DP-1002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30



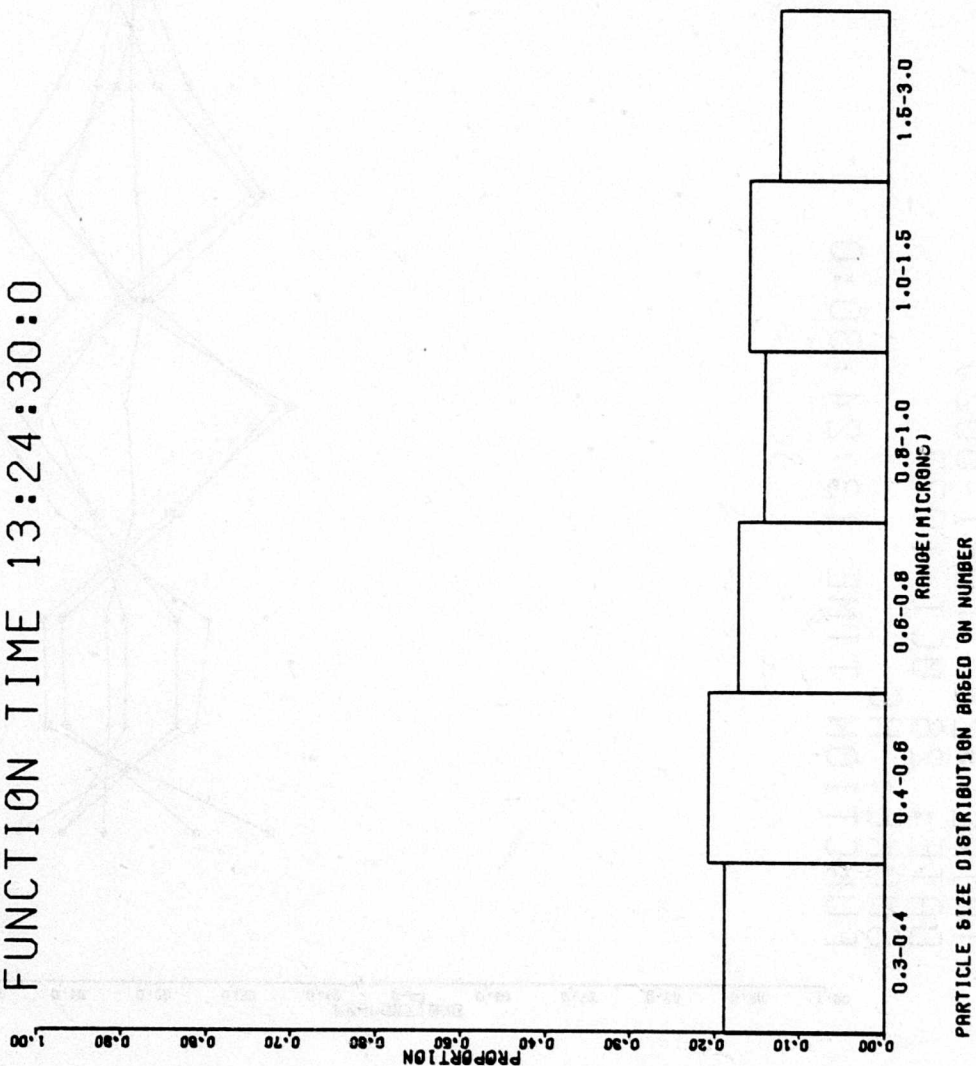
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 26 (OP-1002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30



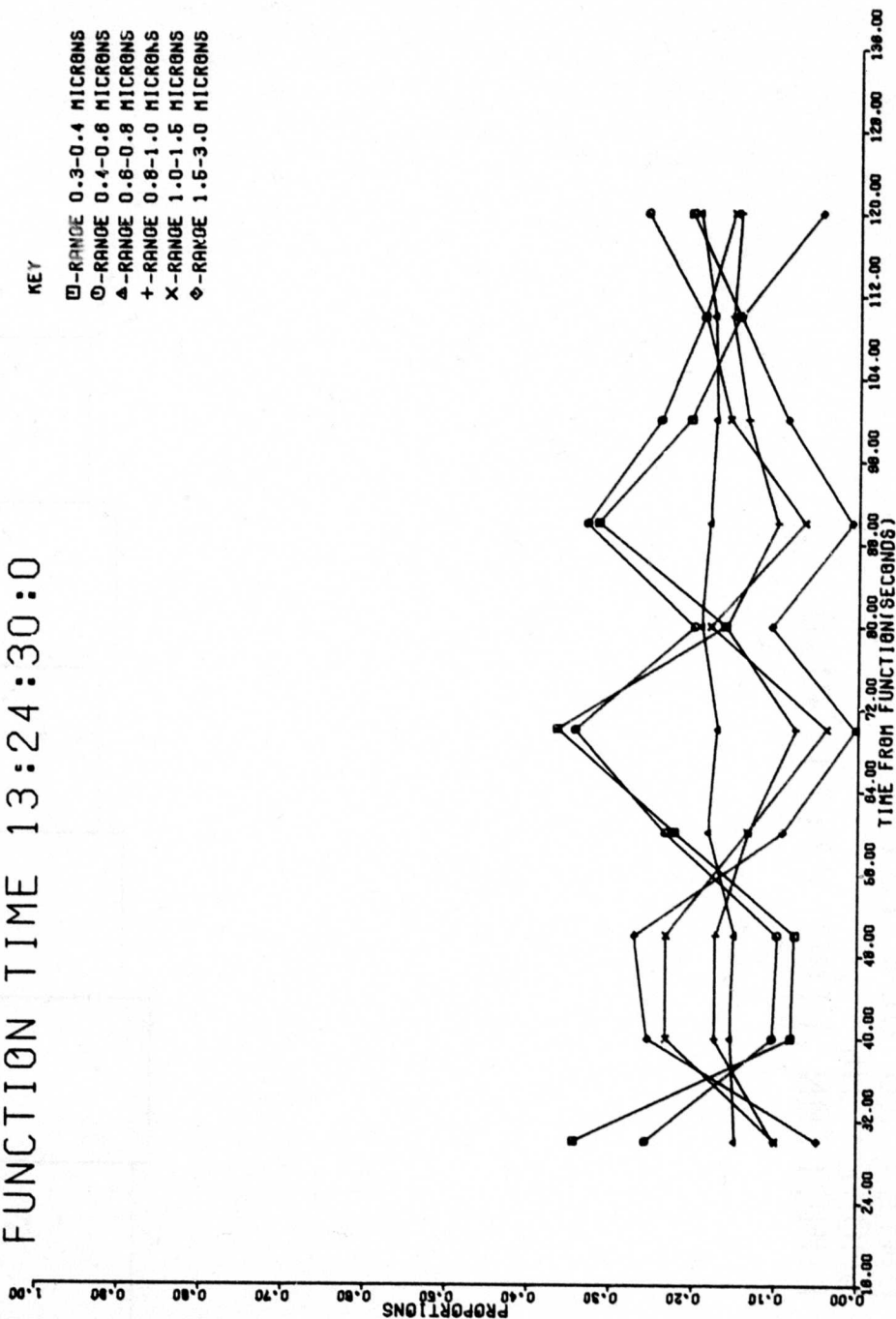
CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #26 (DP1-002)
DATE: 26 OCT 1977
SMOKE: HC
FUNCTION TIME 13:24:30:0



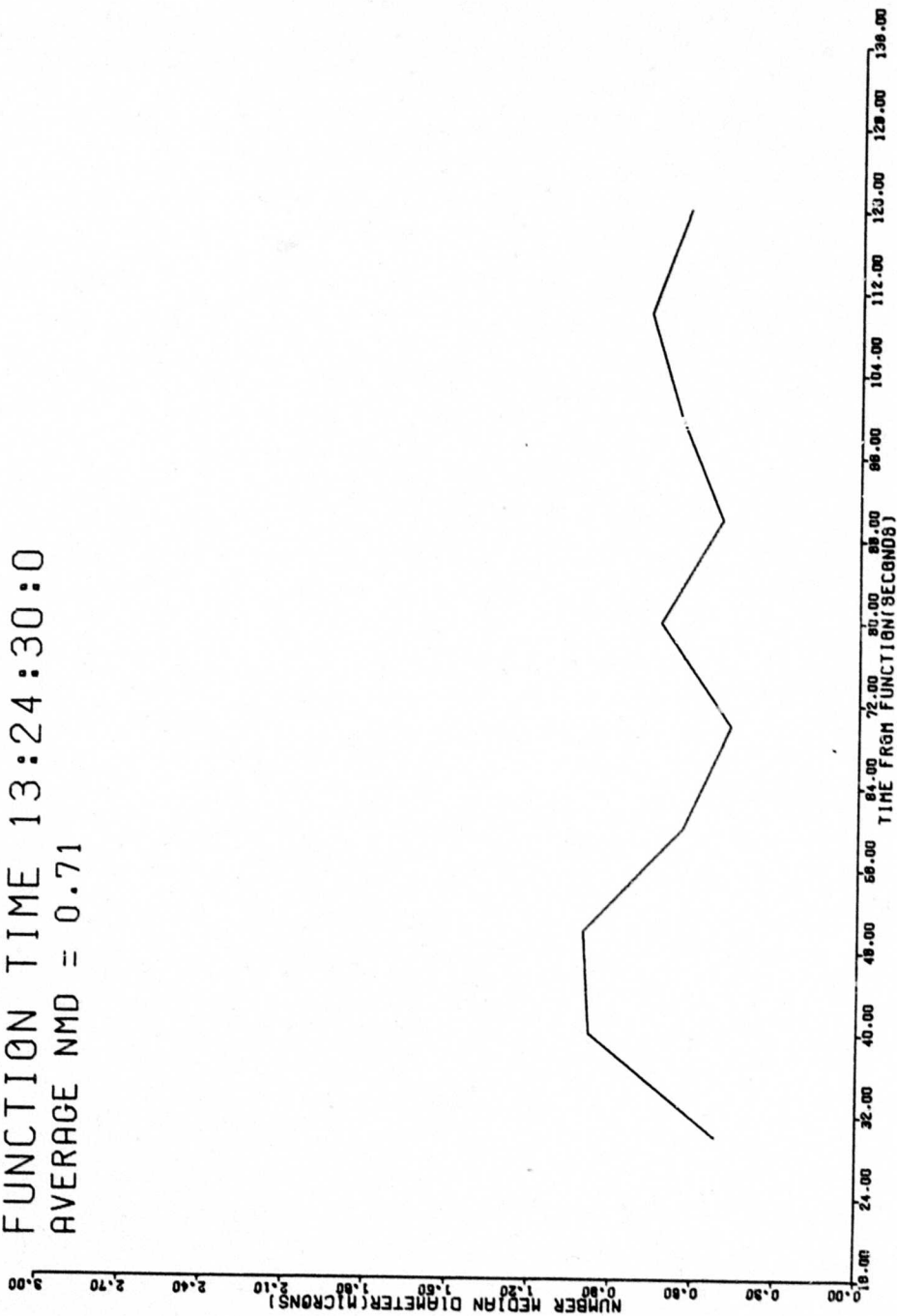
TRIAL #26 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30:0

KEY
 □ - RANGE 0.3-0.4 MICRONS
 ○ - RANGE 0.4-0.6 MICRONS
 ▲ - RANGE 0.6-0.8 MICRONS
 + - RANGE 0.8-1.0 MICRONS
 x - RANGE 1.0-1.6 MICRONS
 ◇ - RANGE 1.6-3.0 MICRONS



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #26 (DP1-002)
 DATE: 26 OCT 1977
 SMOKE: HC
 FUNCTION TIME 13:24:30:0
 AVERAGE NMD = 0.71



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-19

TRIAL DP1-002-T-27 (HC SMOKE) 27 OCT 1977

SUMMARY OF TEST DATA	B-I-19-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-19-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	B-I-19-7
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	B-I-19-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-19-20
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-19-21
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-19-22
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-19-23
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	B-I-19-24
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	B-I-19-25
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	B-I-19-26
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-19-27
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	B-I-19-28
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	B-I-19-29
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	B-I-19-30

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	B-I-19-31
FIGURE:	PARTICLE SIZE DISTRIBUTION	B-I-19-32
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	B-I-19-33
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME	B-I-19-34

SUMMARY OF TEST DAY DATA

Trial: 27

Date: 27 Oct 77

Time: 1147:00 MDT

Wind Direction (Transport) (degrees) (4m)	151
Mean Wind Speed (Transport) (\bar{u} , m/sec)	9.5
Temperature of 2-meters, Trial Time (T, °C).....	21.6
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	7.1
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m).....	4.1
Temperature Gradient, 0.5-8m (ΔT , °C).....	-1.5
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.14
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	25
Solar Azimuth (deg)	153.0
Solar Altitude (deg)	35.2
Air Density - ρ (kg m ⁻³)	1.020
Solar Radiation (Langleys per minute)	0.843
Barometric Pressure (millibars)	864.6
Visibility (km)	80
Reflectivity, OD Target	ND
Haze (footlamberts)	352
Brightness, Background (footlamberts)	800
Brightness, White Target (footlamberts)	1404
Brightness, OD Target (footlamberts)	300
Percent Opaque Cloud Cover	2

Munitions/Submunitions Used (HC, 155mm Canisters)	24
Number of Munitions/Submunitions Functioned	15
Particle Size Range (micron)	
(0.3 - 0.4) . . . . .	.14
(0.4 - 0.6) . . . . .	.19
(0.6 - 0.8) . . . . .	.17
(0.8 - 1.0) . . . . .	.16
(1.0 - 1.5) . . . . .	.18
(1.5 - 3.0) . . . . .	.16
$\text{Log}_{10}\text{NMD}$	-.10641
$\sigma\text{Log}_{10}\text{NMD}$ . . . . .	.25910
NMD . . . . .	.78
MMD	1.12

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1147:00*	3	2	2
1147:10	72	51	5
1147:20	95	71	8
1147:30	106	72	9
1147:40	174	82	9
1147:50	202	100	9
1148:00	204	113	10
1148:10	204	113	11
1148:20	257	124	13
1148:30	341	139	13
1148:40	339	110	13
1148:50	332	108	13
1149:00	332	107	13
1149:30	97	98	10

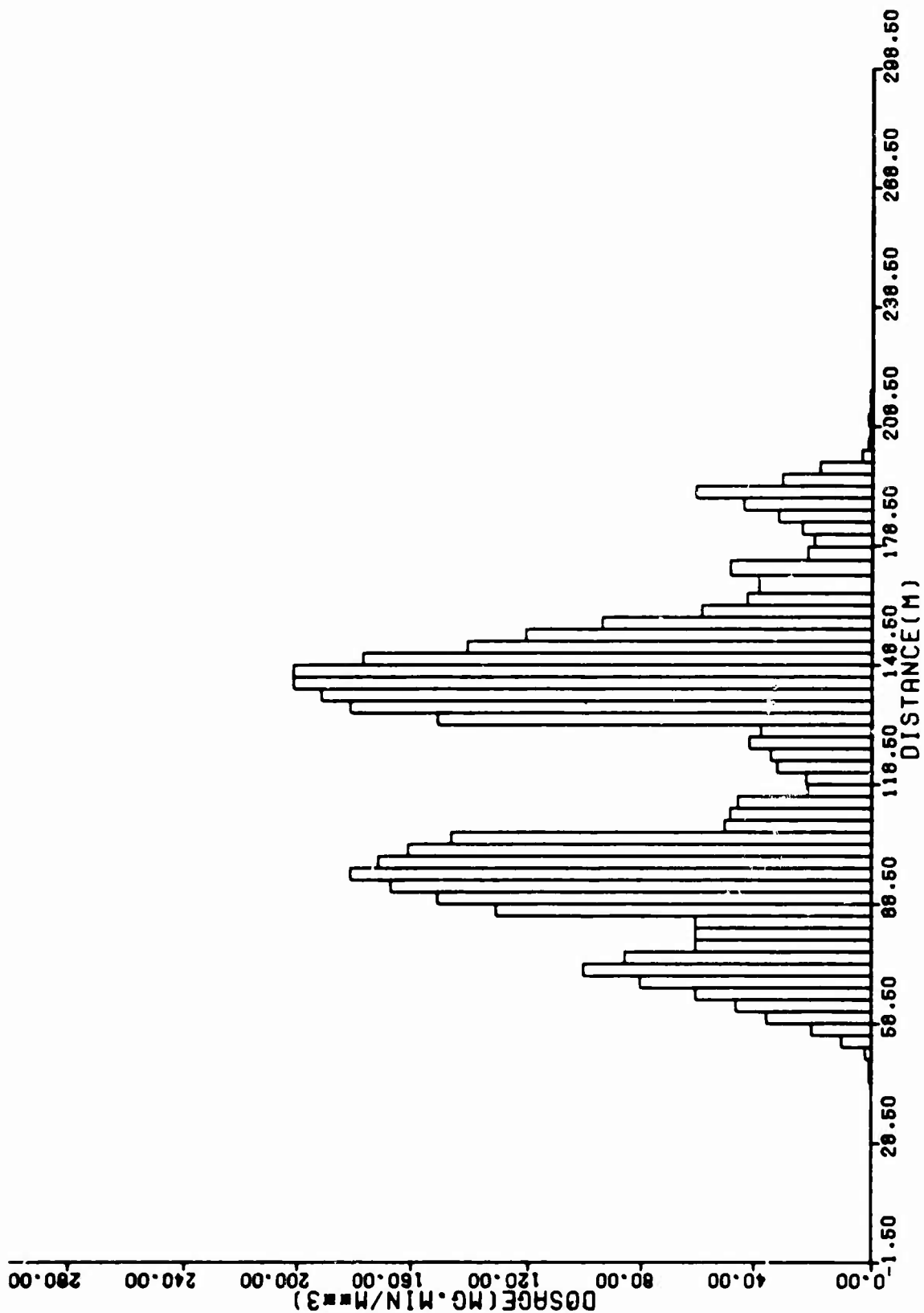
*Only one canister ignited during this picture frame.

SKY BRIGHTNESS

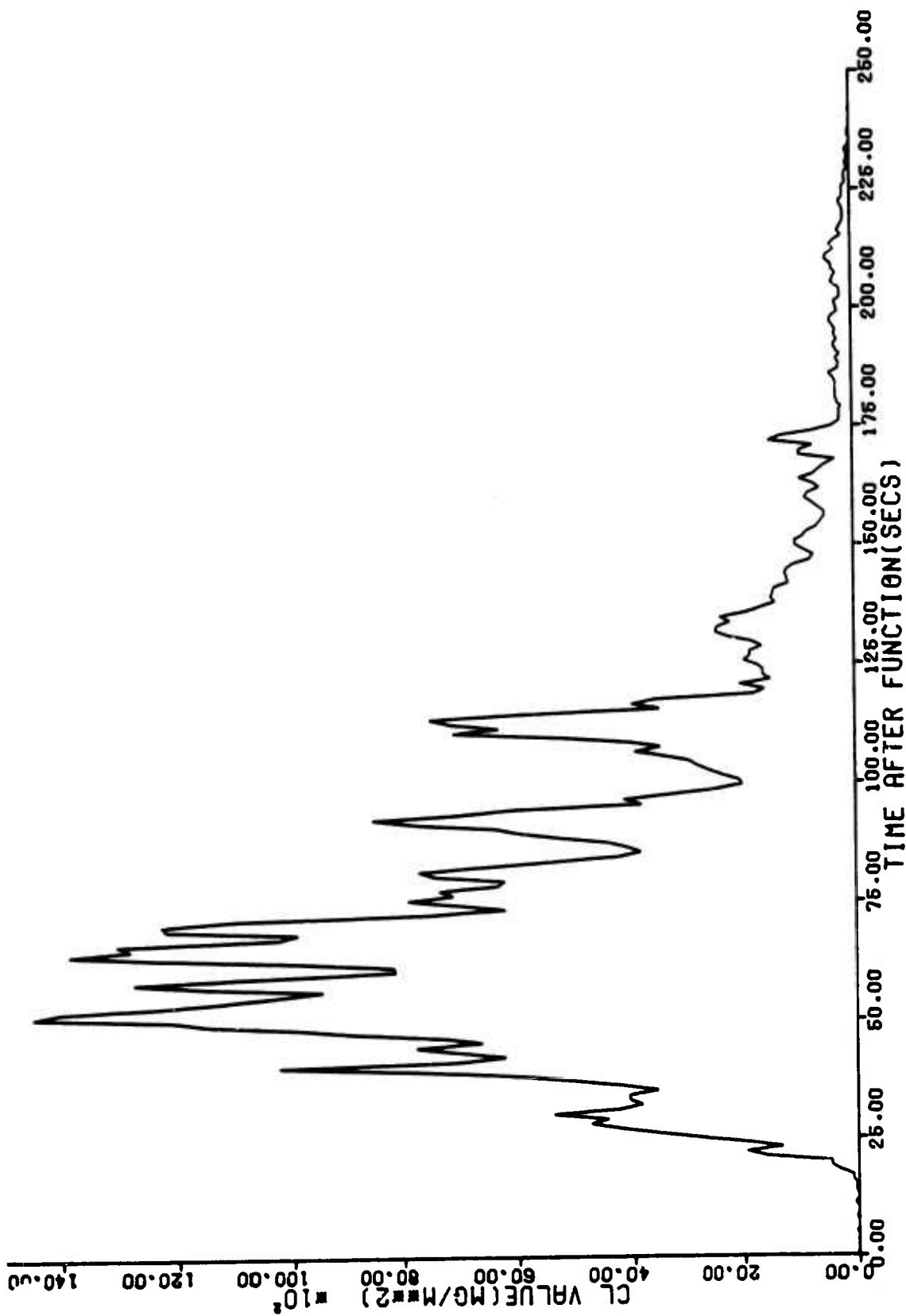
Light Meter Readings

<u>ELEVATION ANGLE</u>	<u>BRIGHTNESS FOOTCANDLES</u>
0	816
5	1640
10	1640
15	1640
20	1300
25	1300
30	1300
35	1140
40	1140
45	1140

Viewing azimuth 240° except 255° at 0 degrees elevation

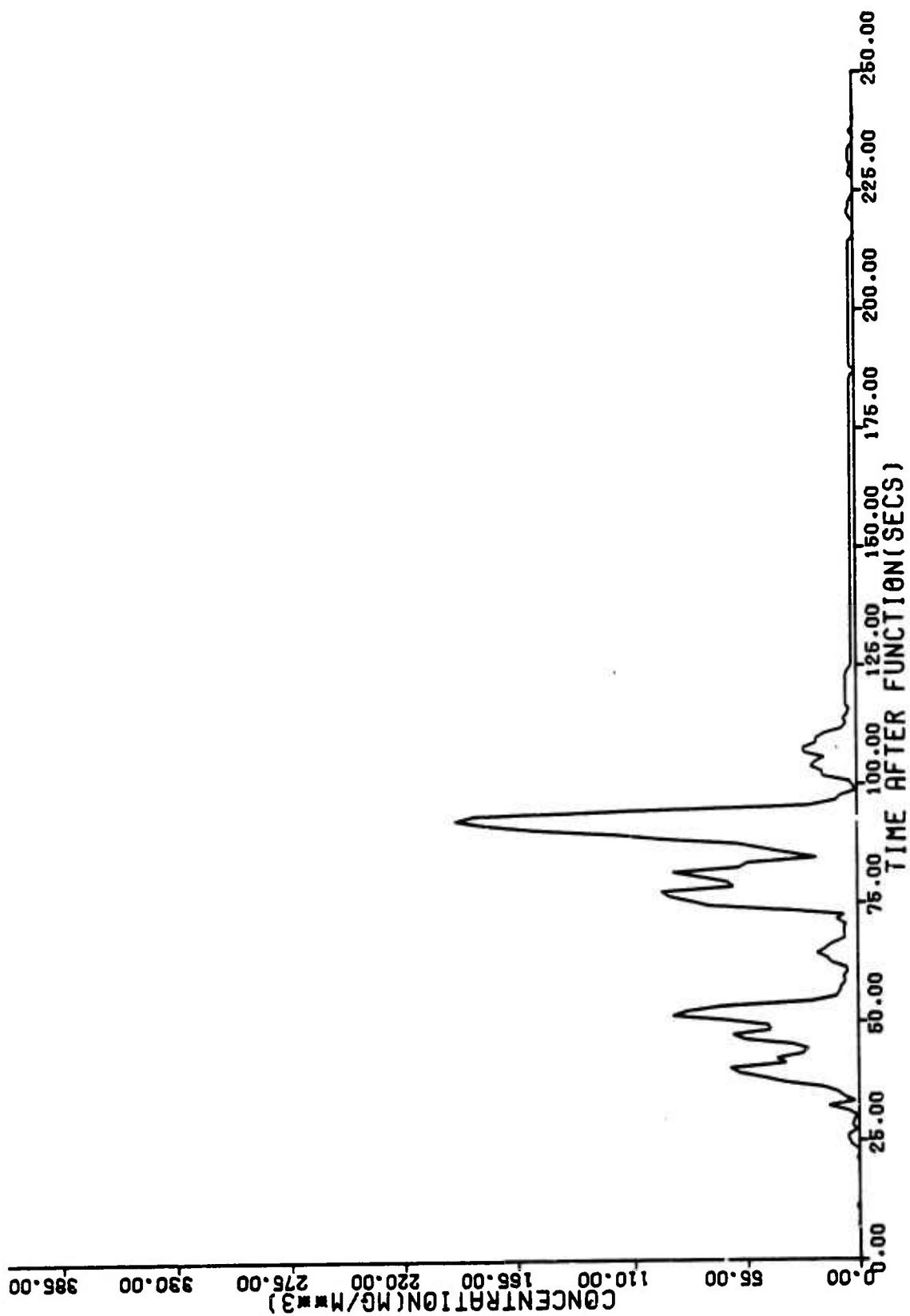


TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE



TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE

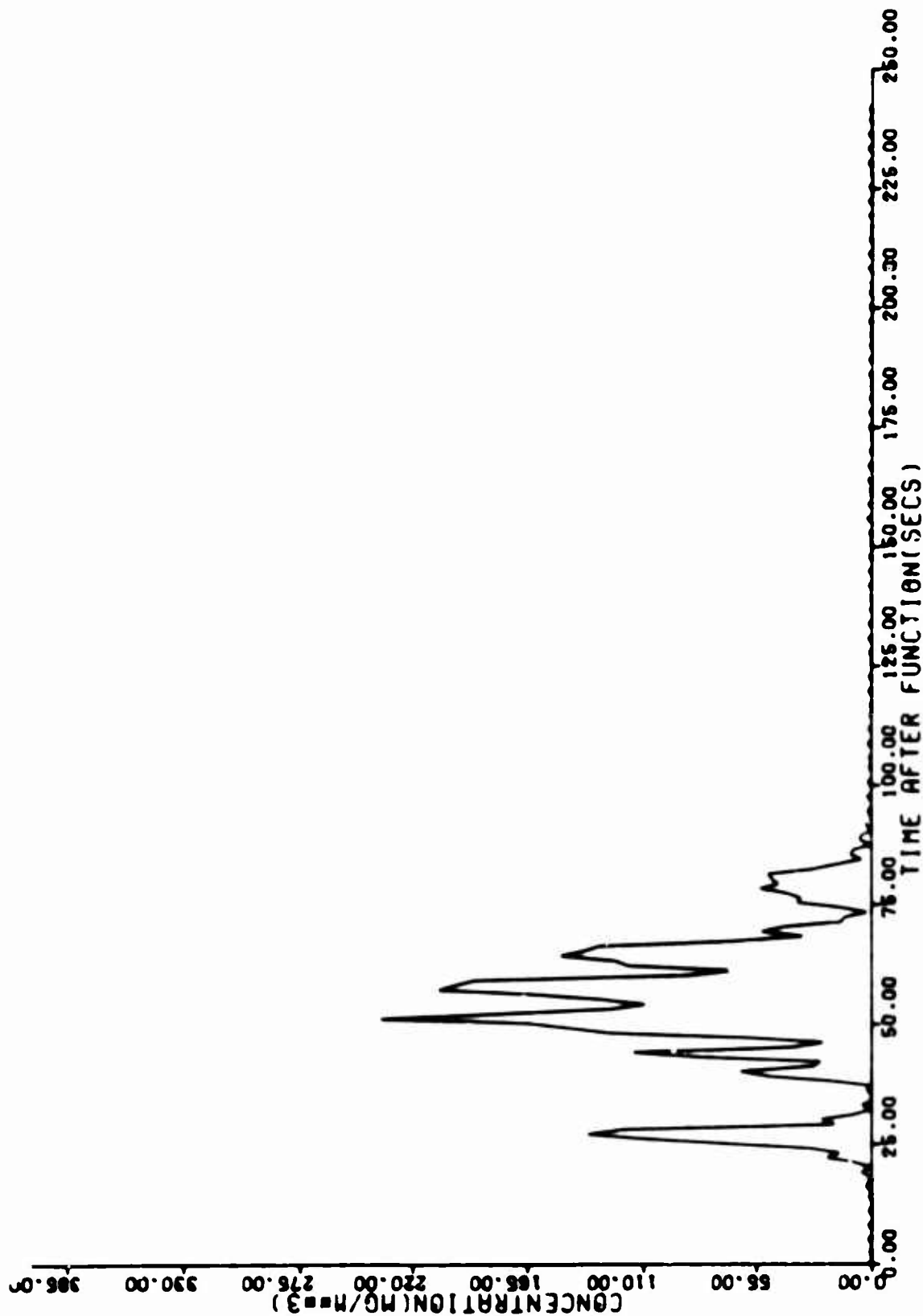
CL VALUES COMPUTED FROM AEROSOL PHOTOMETERS



TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE

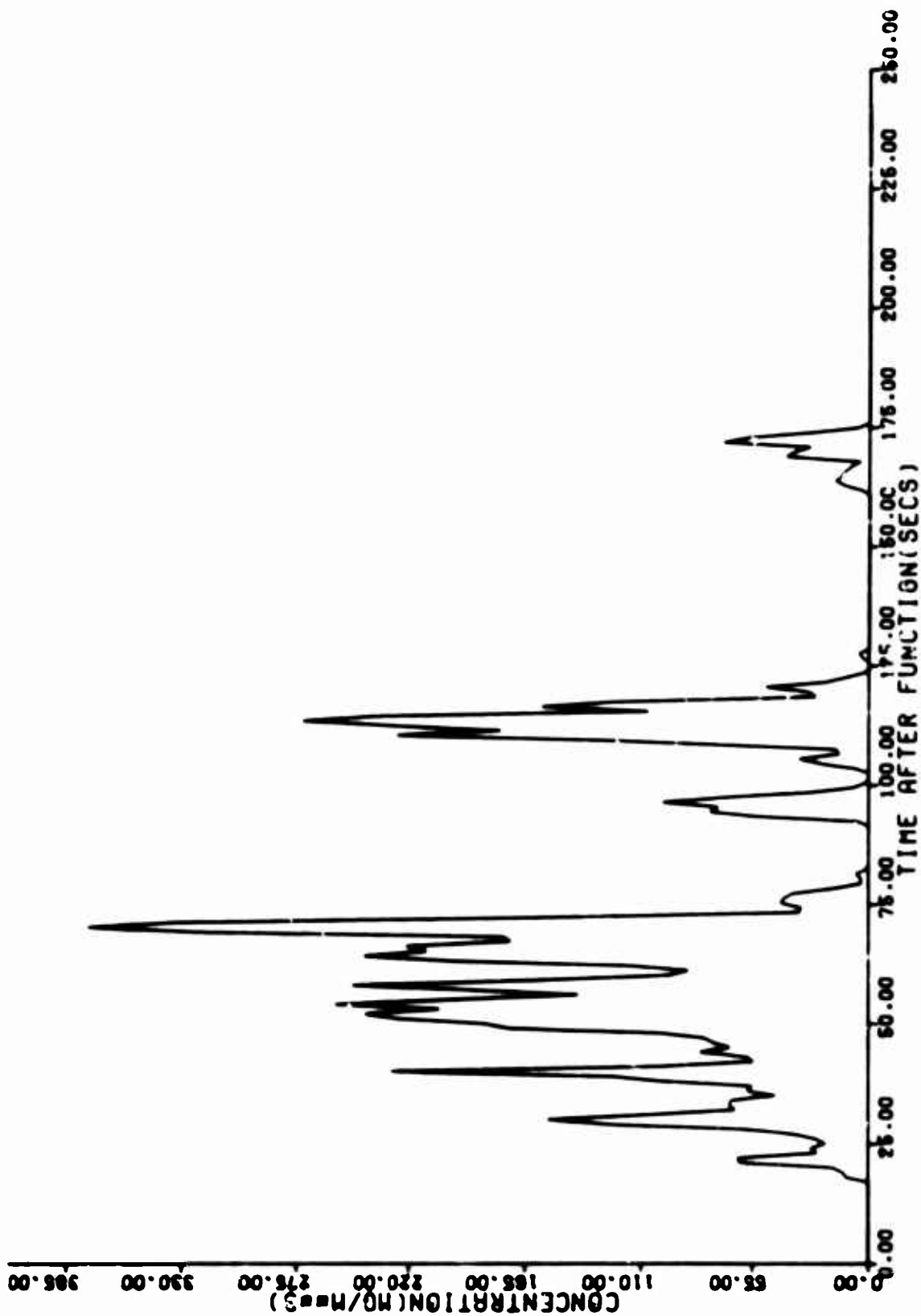
AEROSOL PHOTOMETER #4, X=0.00, Y=66.00, Z=0.00

8-1-19-9



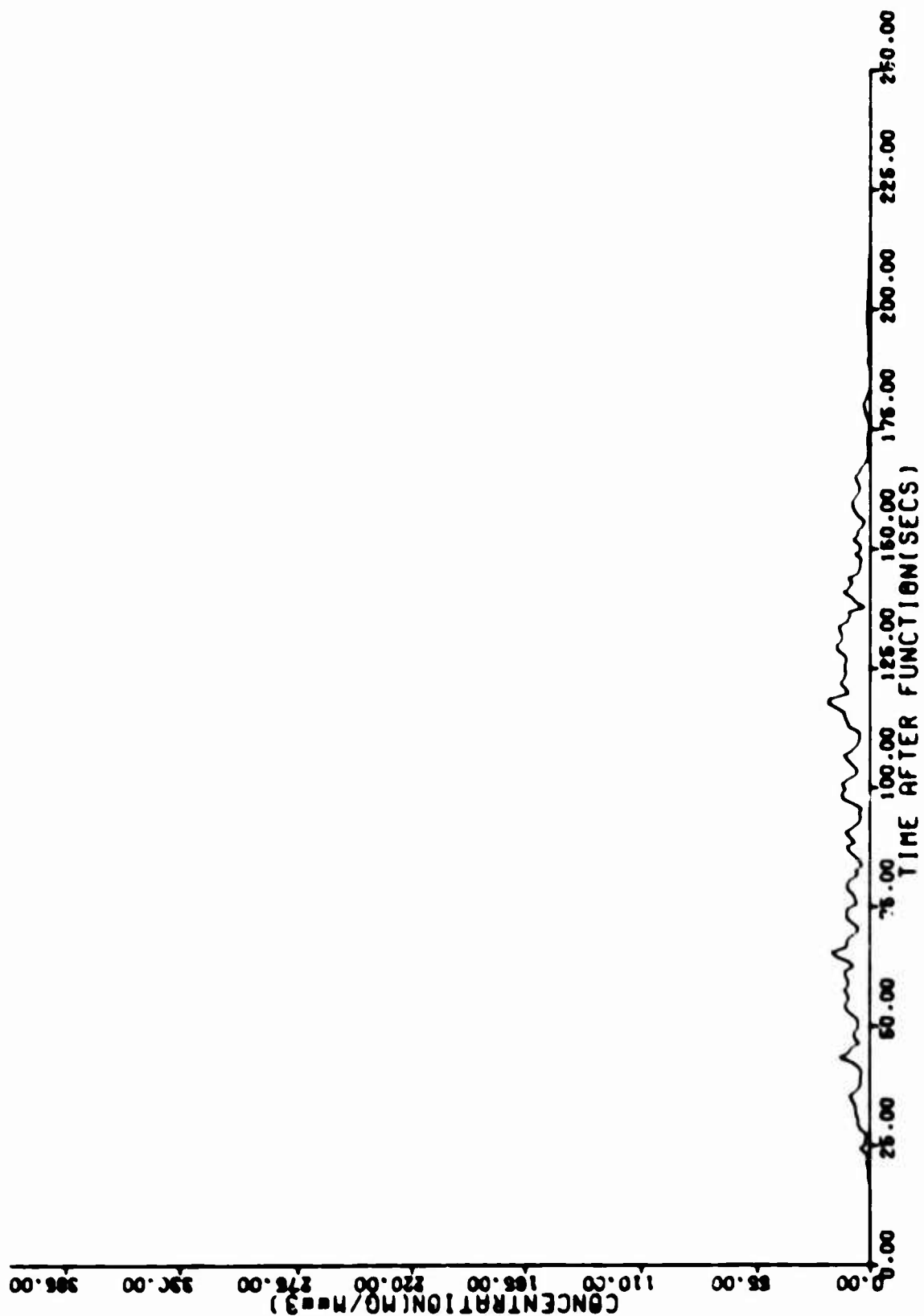
TRIAL 27 (DP-1002). 27 OCT 1977, 11:47:00, HC SMOKE

AEROSOL PHOTOMETER #5, X=0.00, Y=84.00, Z=0.00



TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

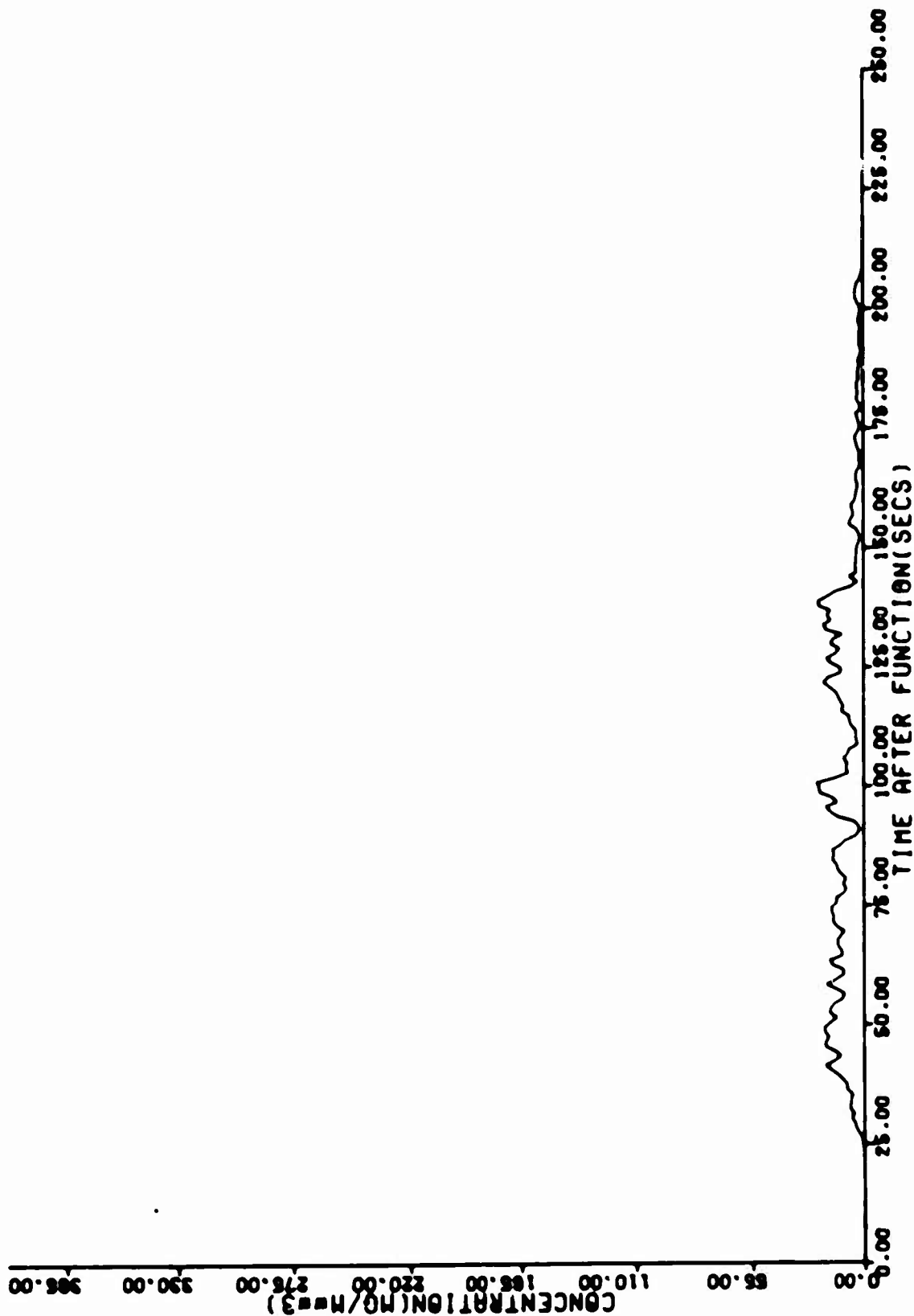
: AEROSOL PHOTOMETER #6. X=0.00. Y=102.00. Z=0.00



B-1-19-11

TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

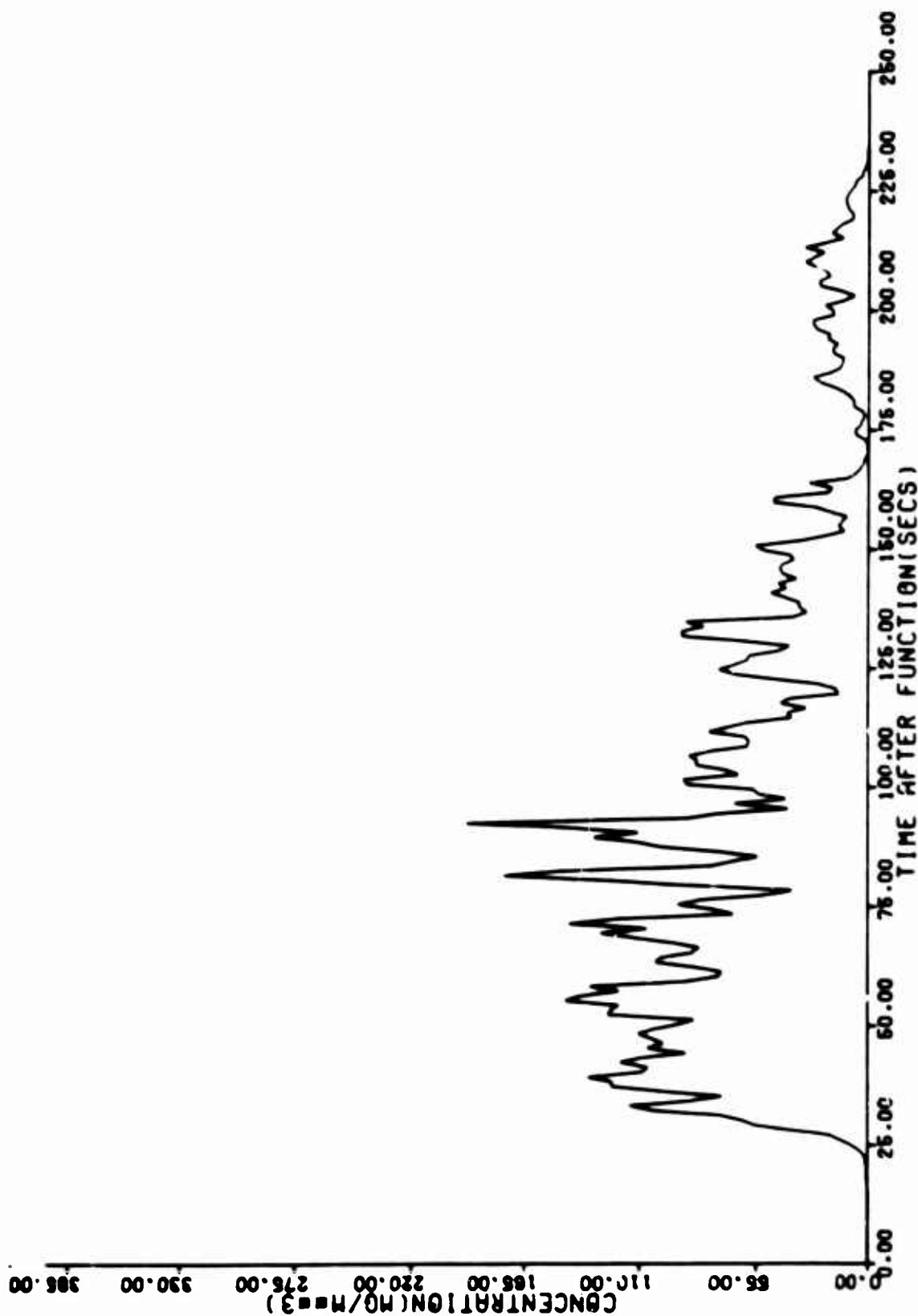
AFRQSMI PHOTAMETER #7. X=0.00. Y=120.00. Z=0.00



TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

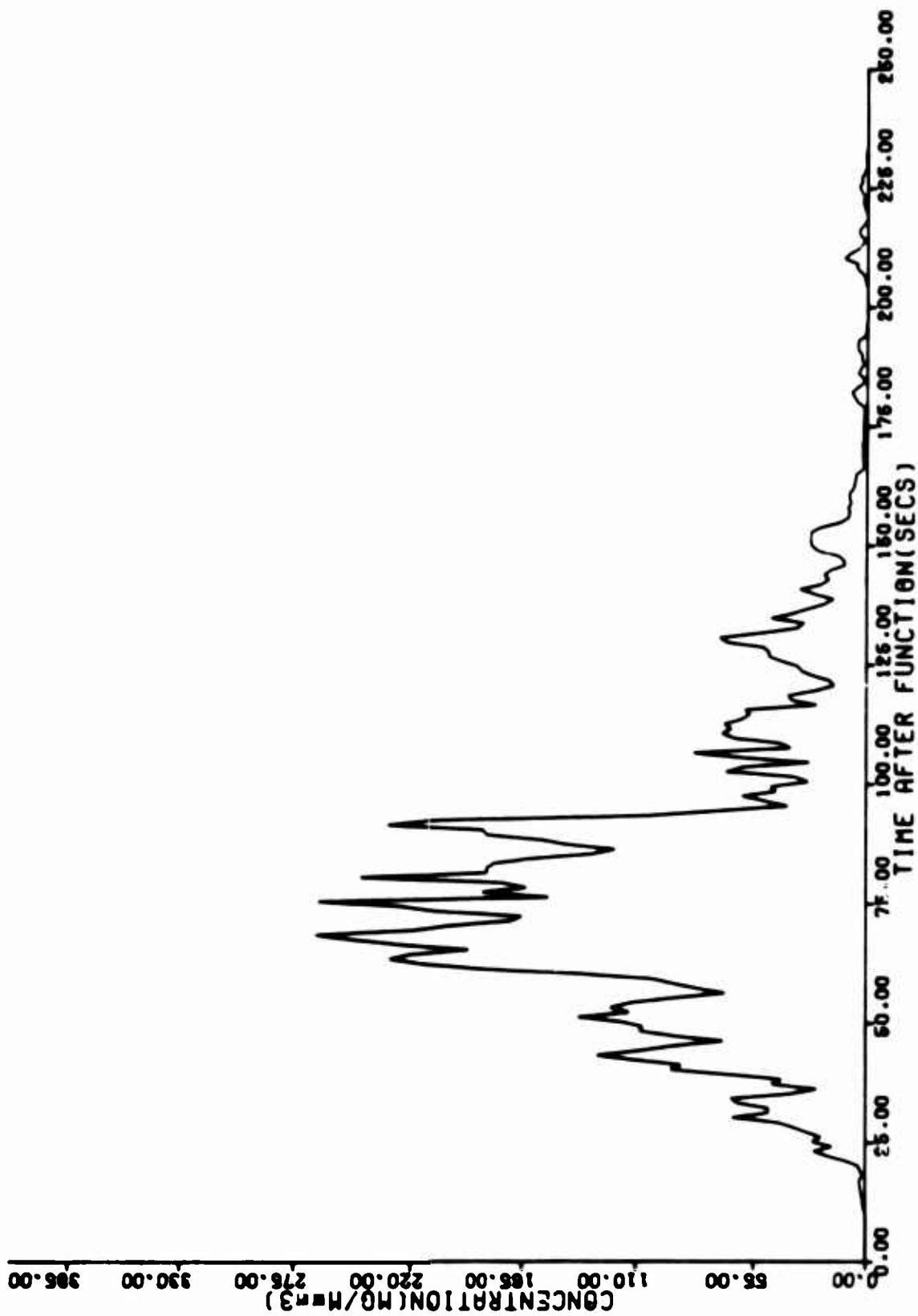
AEROSOL PHOTOMETER #8. X=0.00. Y=129.00. Z=0.00

8-1-19-13



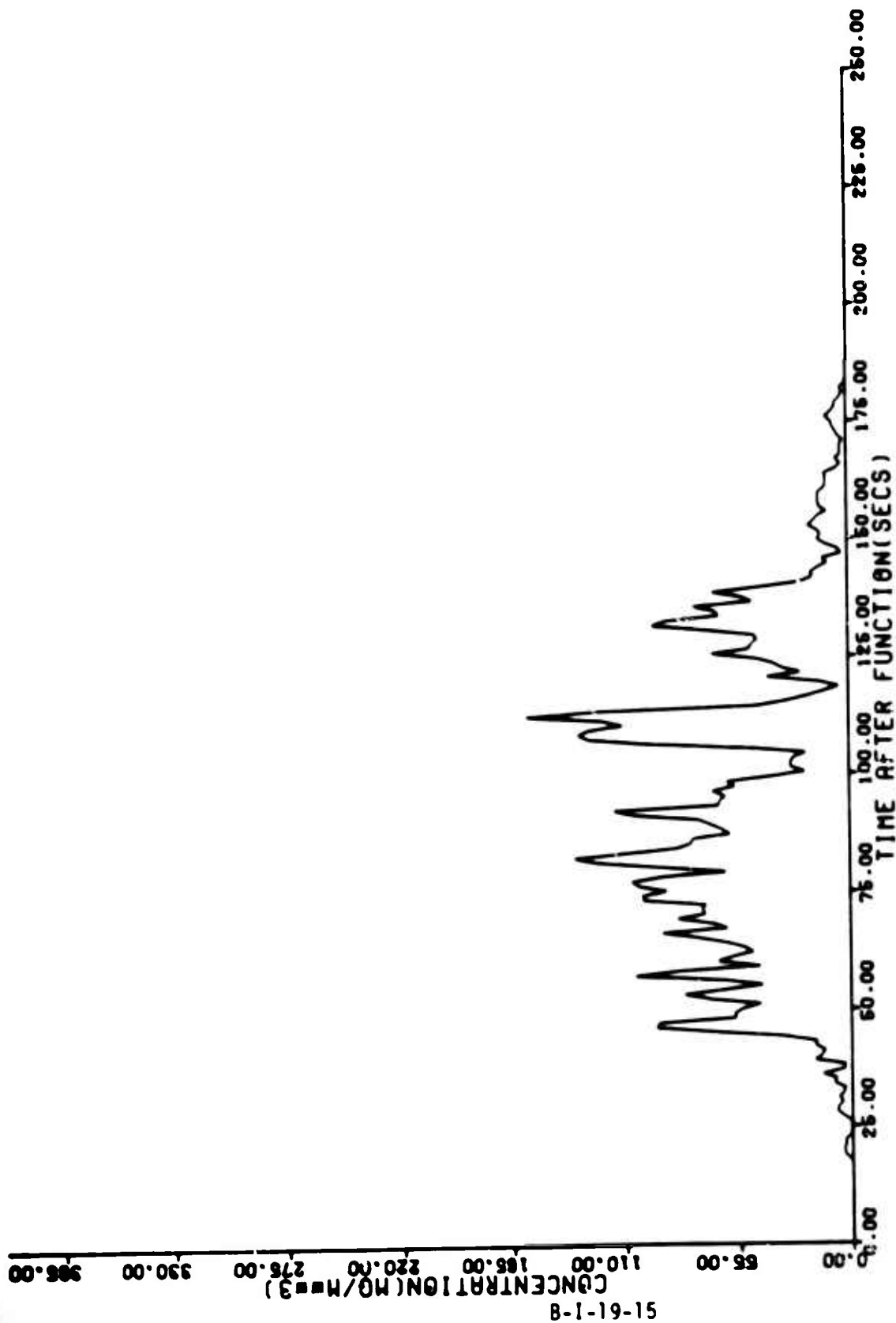
TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

AEROSOL PHOTOMETER #9. X=0.00. Y=138.00. Z=0.00



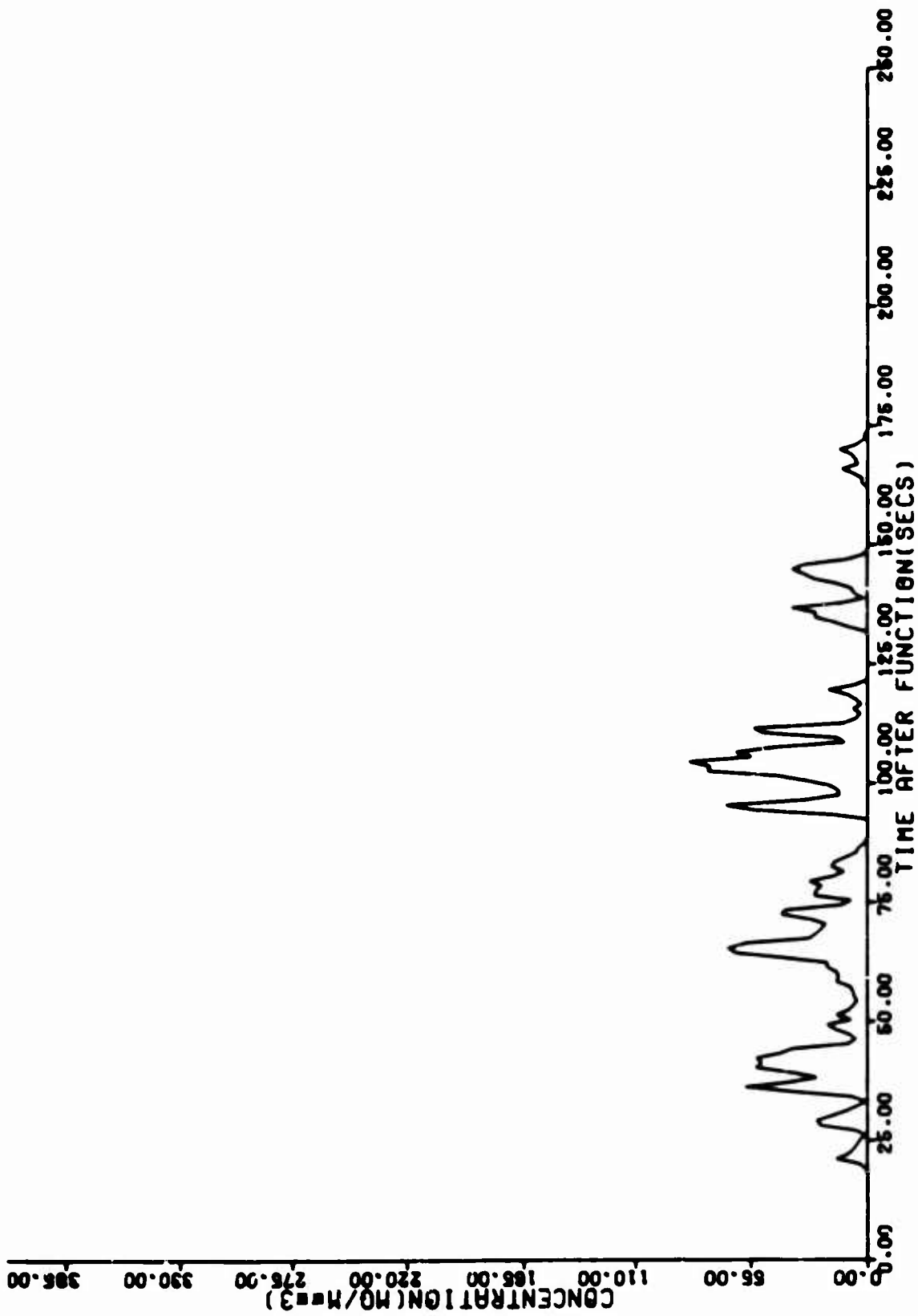
TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE

AEROSOL PHOTOMETER #10, X=0.00, Y=147.00, Z=0.00



TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

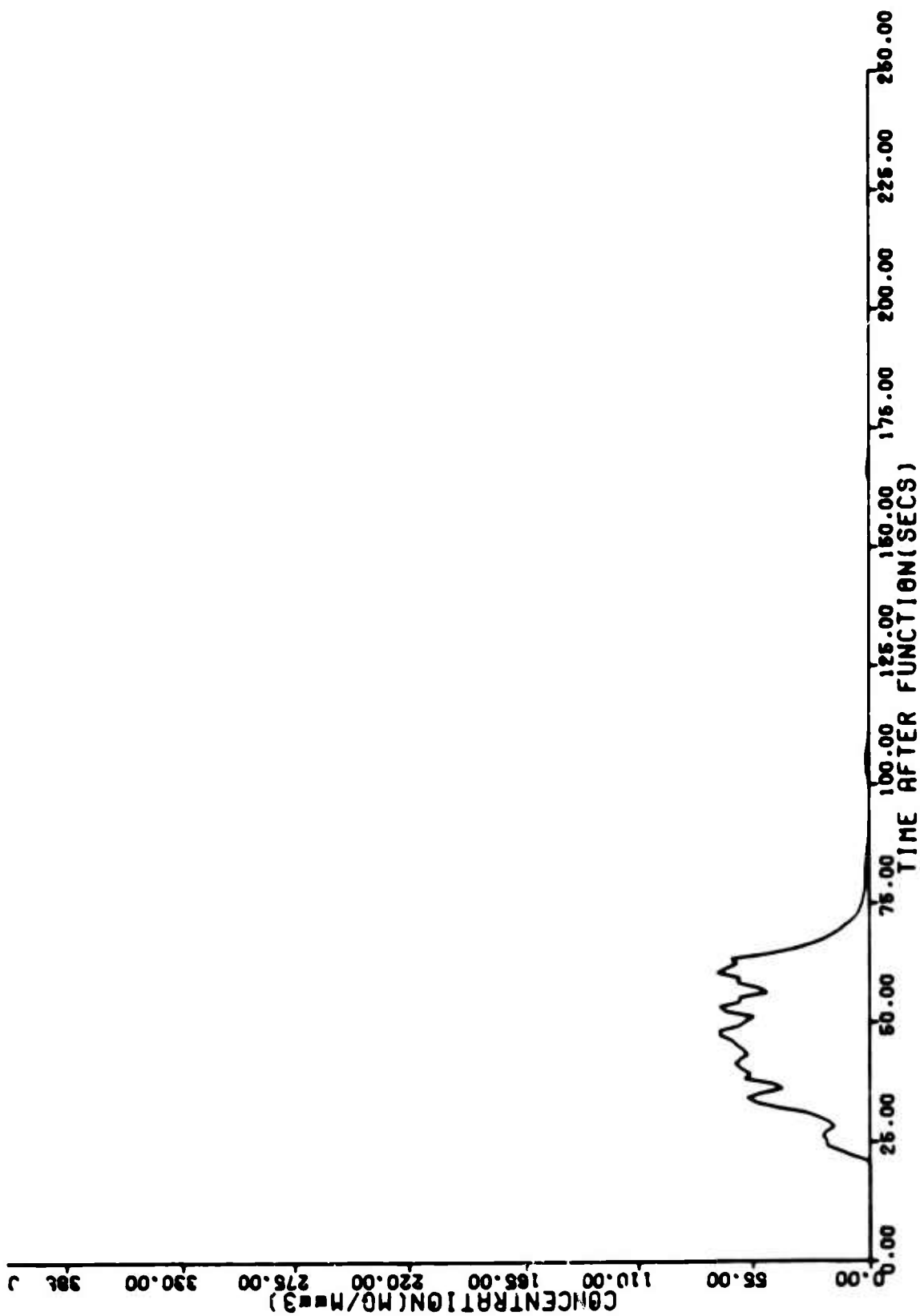
AEROSOL PHOTOMETER #11. X=0.00. Y=156.00. Z=0.00



3-1-19-16

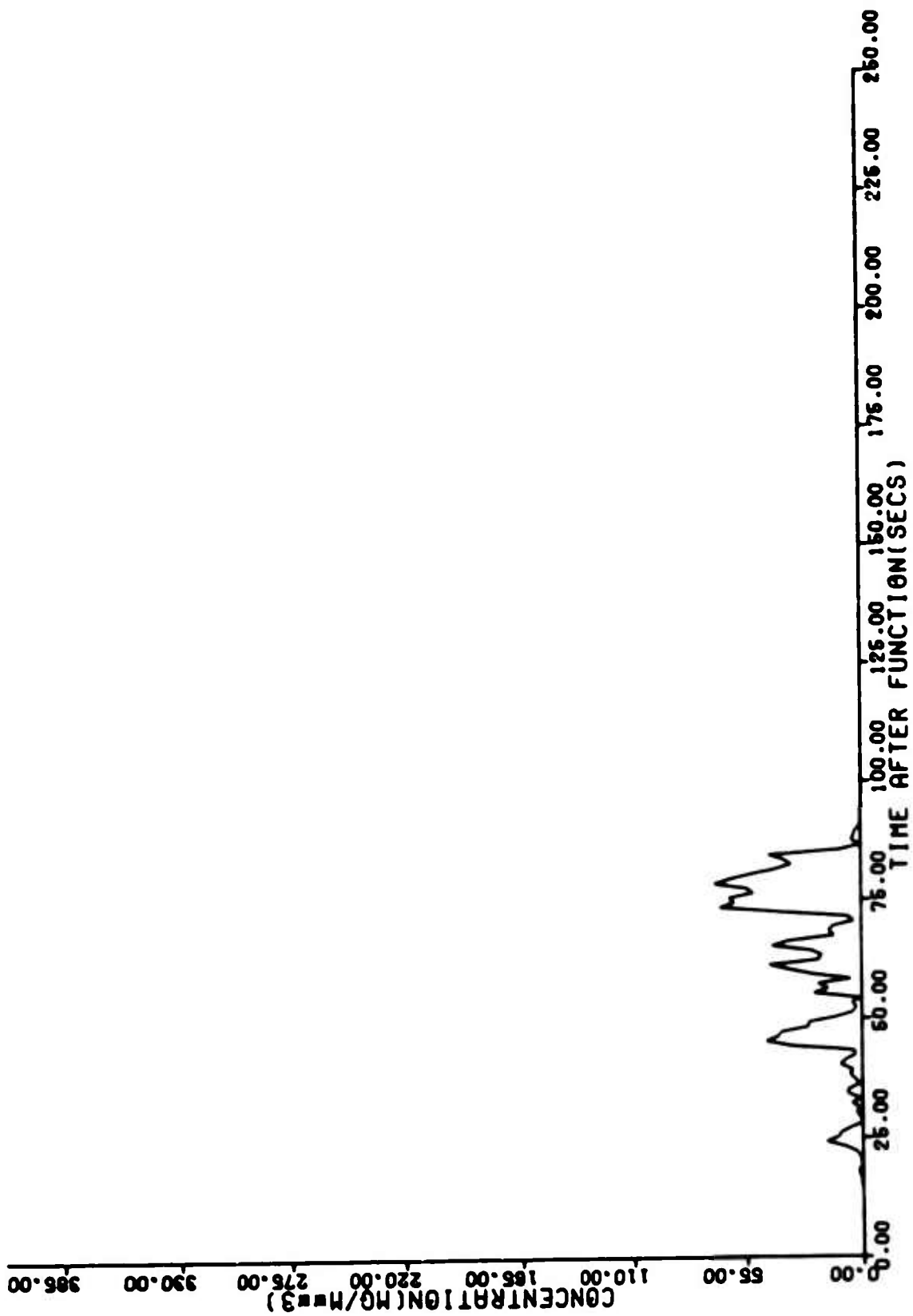
TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

EROSOL PHOTOMETER #12. X=0.00. Y=165.00. Z=0.00



TRIAL 27 (DP-1002). 27 OCT 1977. 11:47:00. HC SMOKE

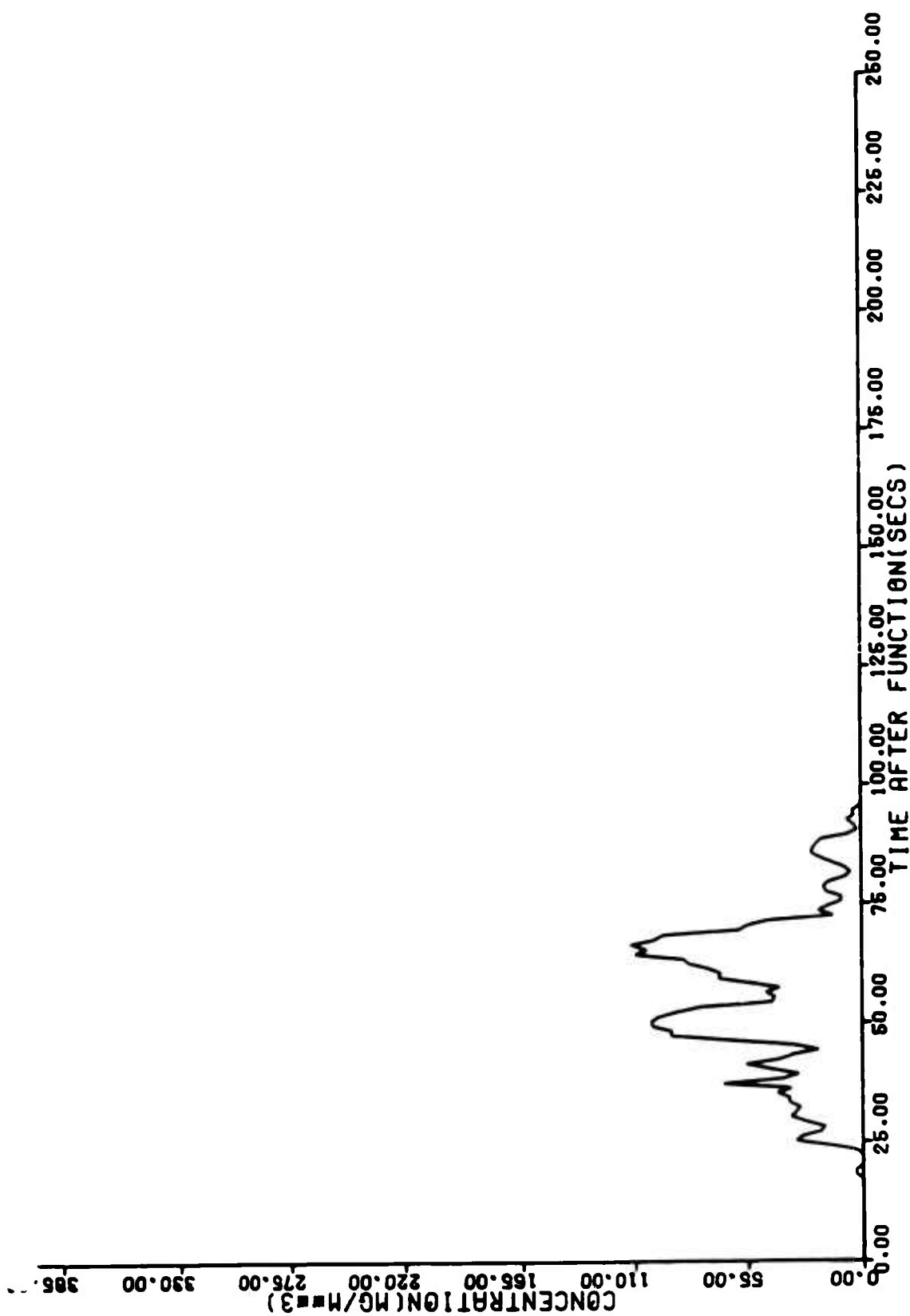
AEROSOL PHOTOMETER #13. X=0.00. Y=174.00. Z=0.00



TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE

AEROSOL PHOTOMETER #14, X=0.00, Y=183.00, Z=0.00

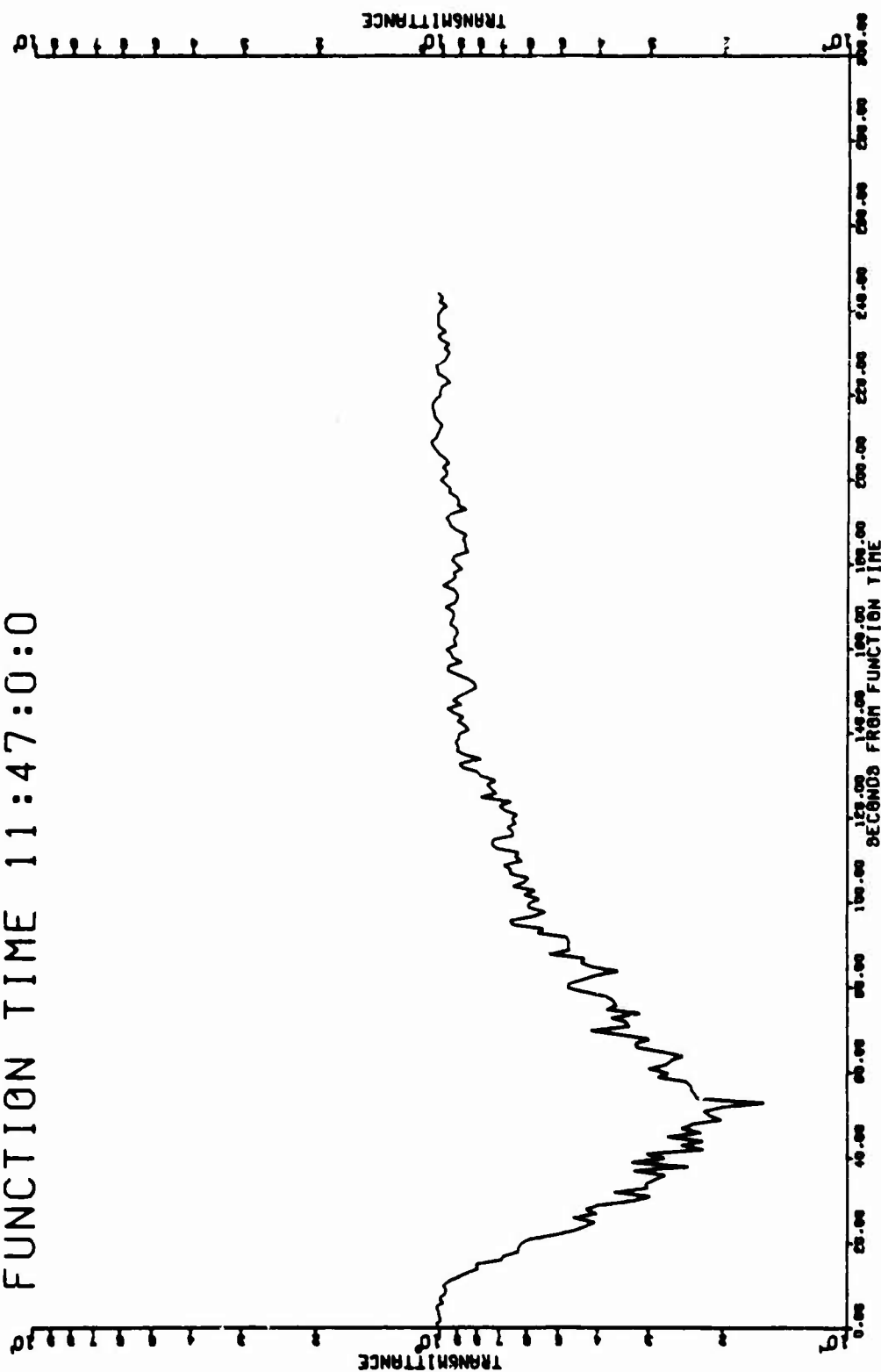
8-1-19-19



TRIAL 27 (DP-1002), 27 OCT 1977, 11:47:00, HC SMOKE

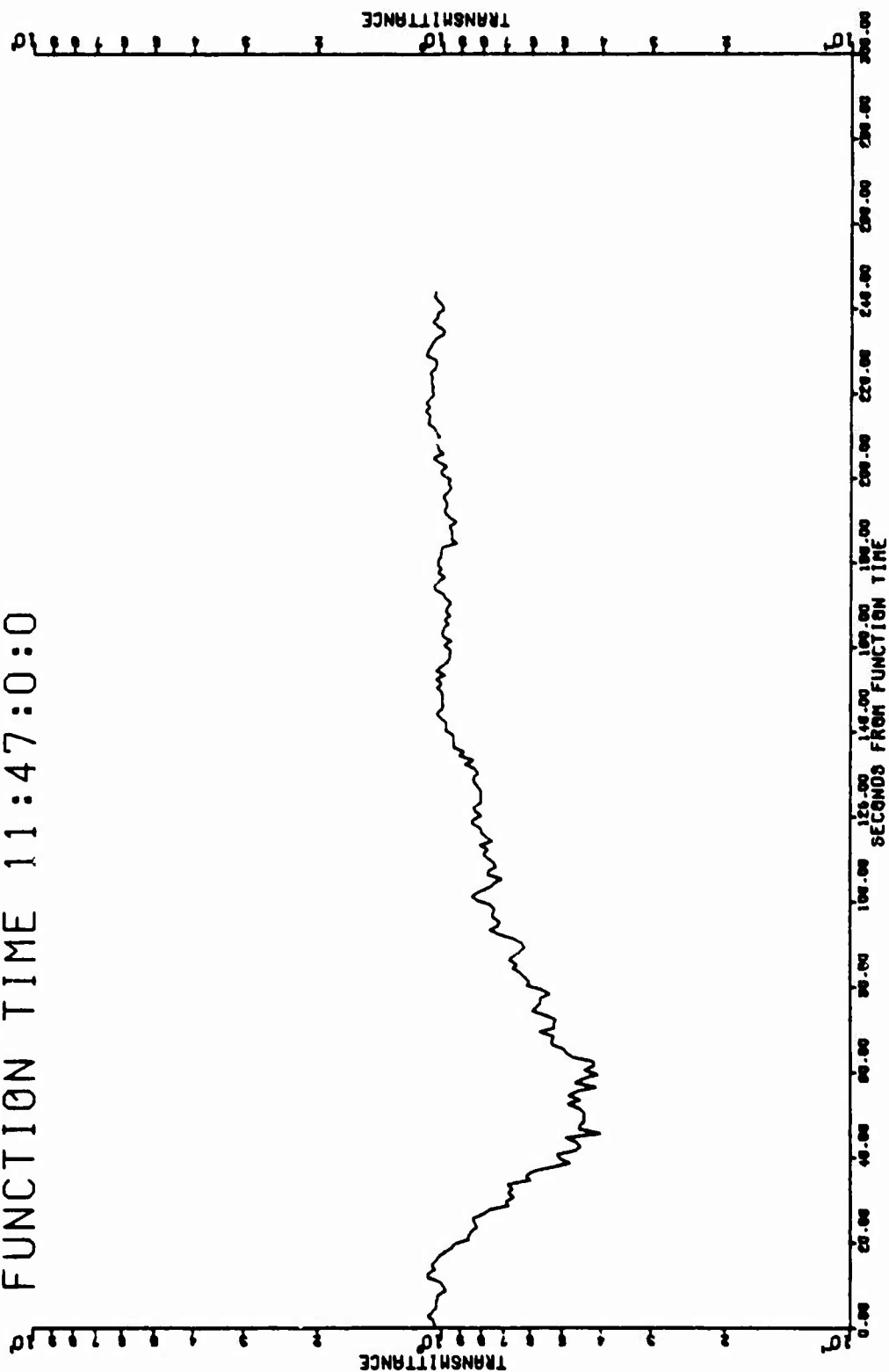
AEROSOL PHOTOMETER #15, X=0.00, Y=192.00, Z=0.00

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



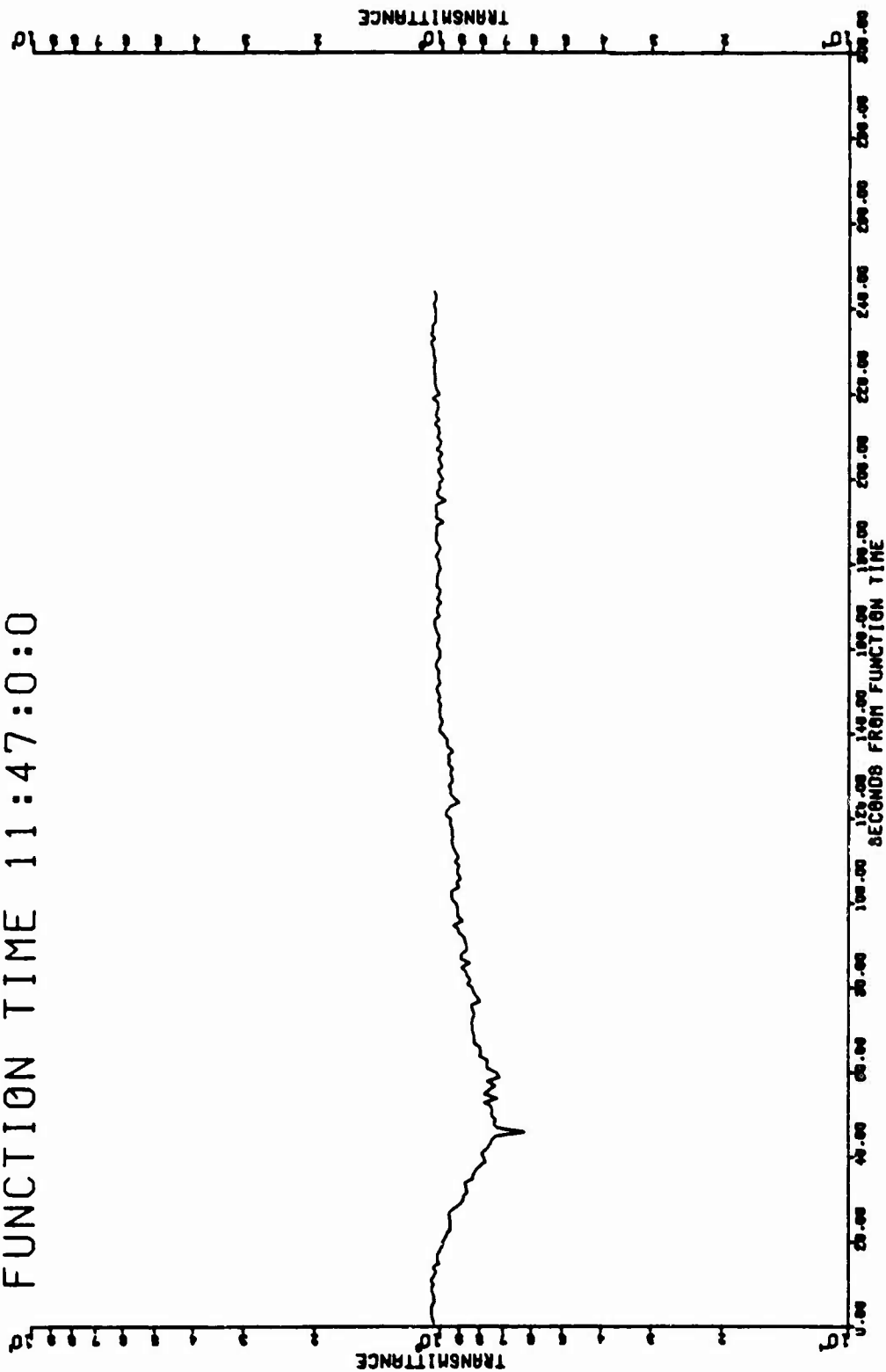
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



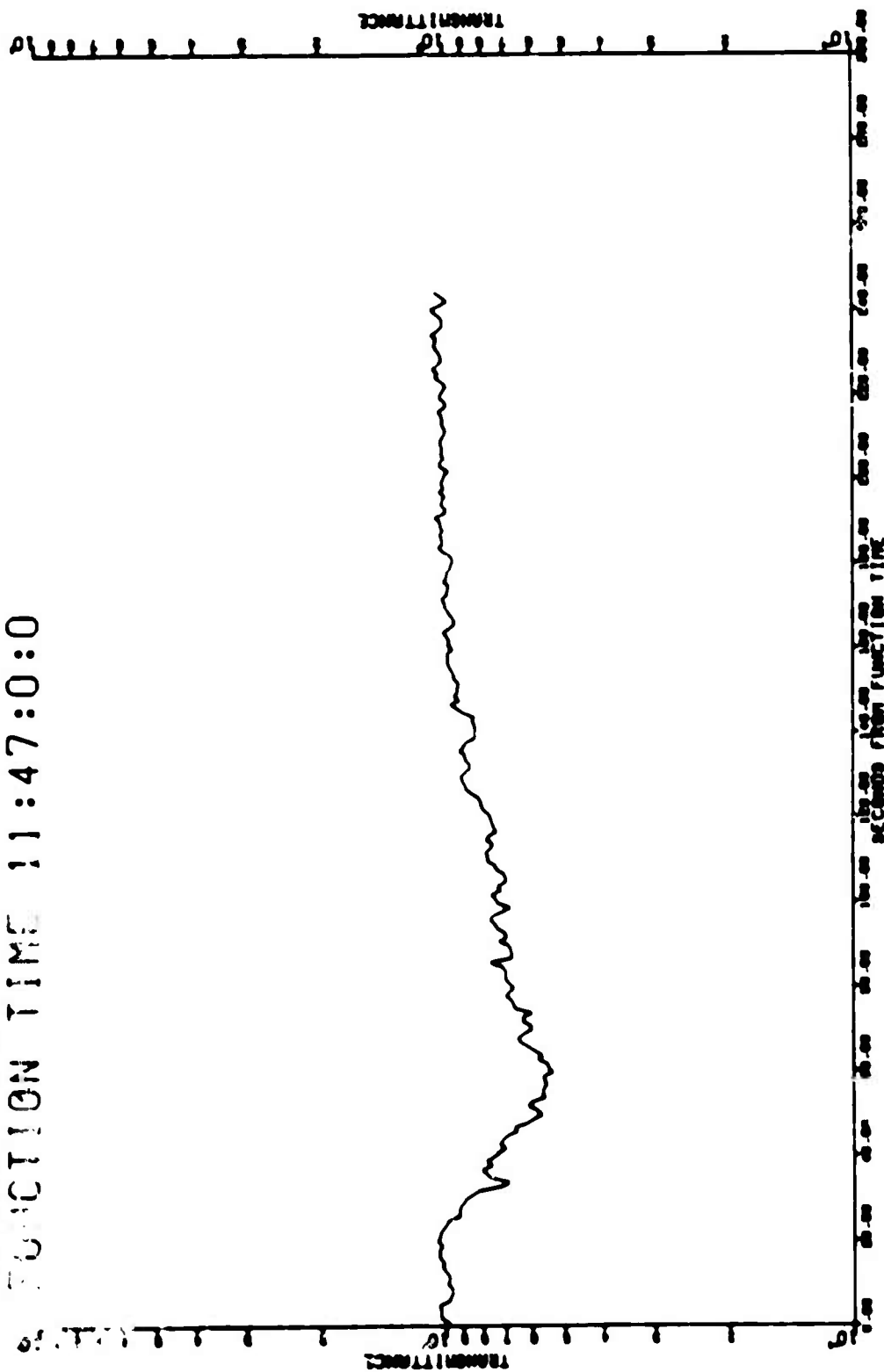
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #27 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0



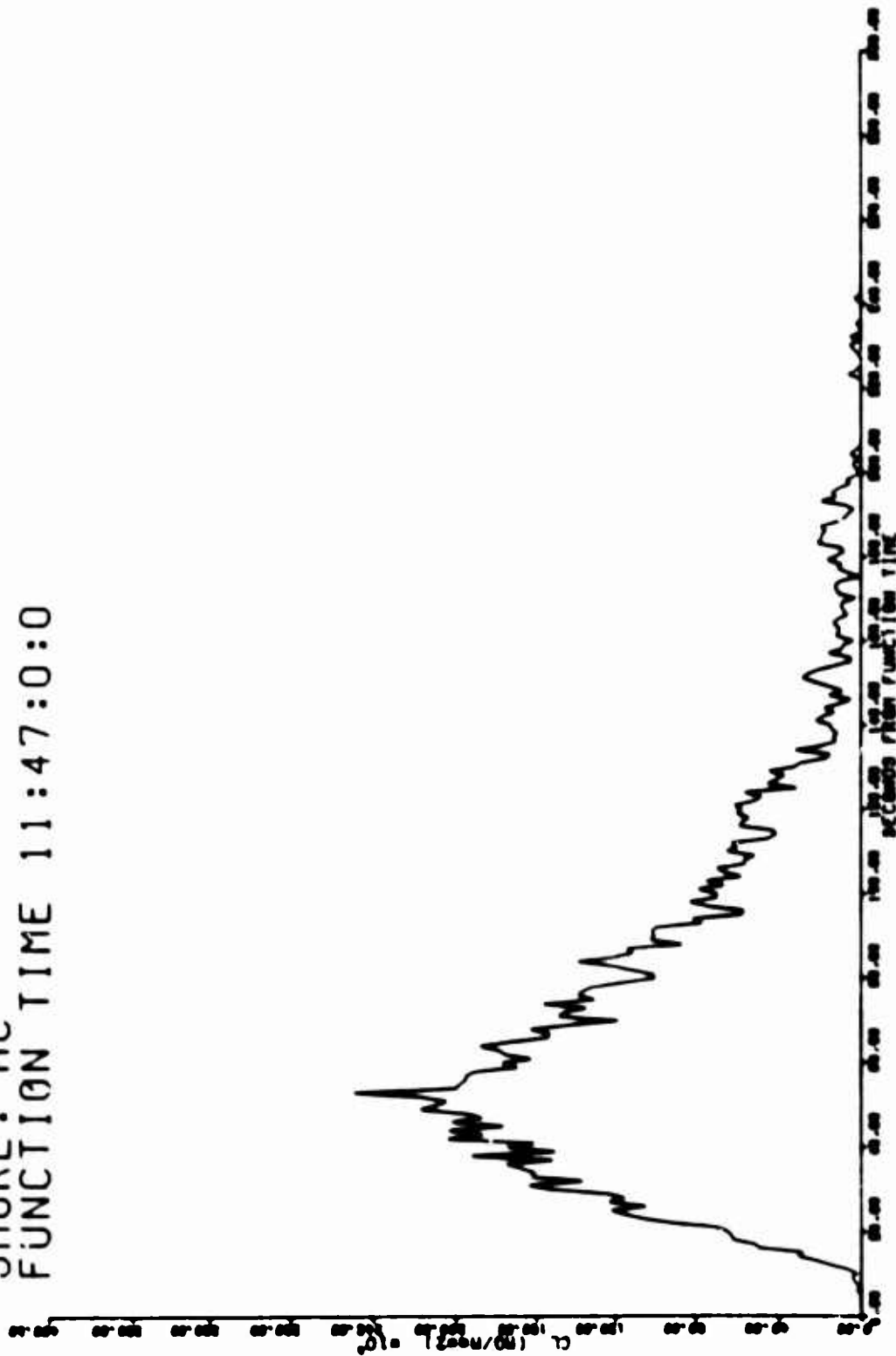
TRANSMITTANCE VERSUS TIME FOR
 WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



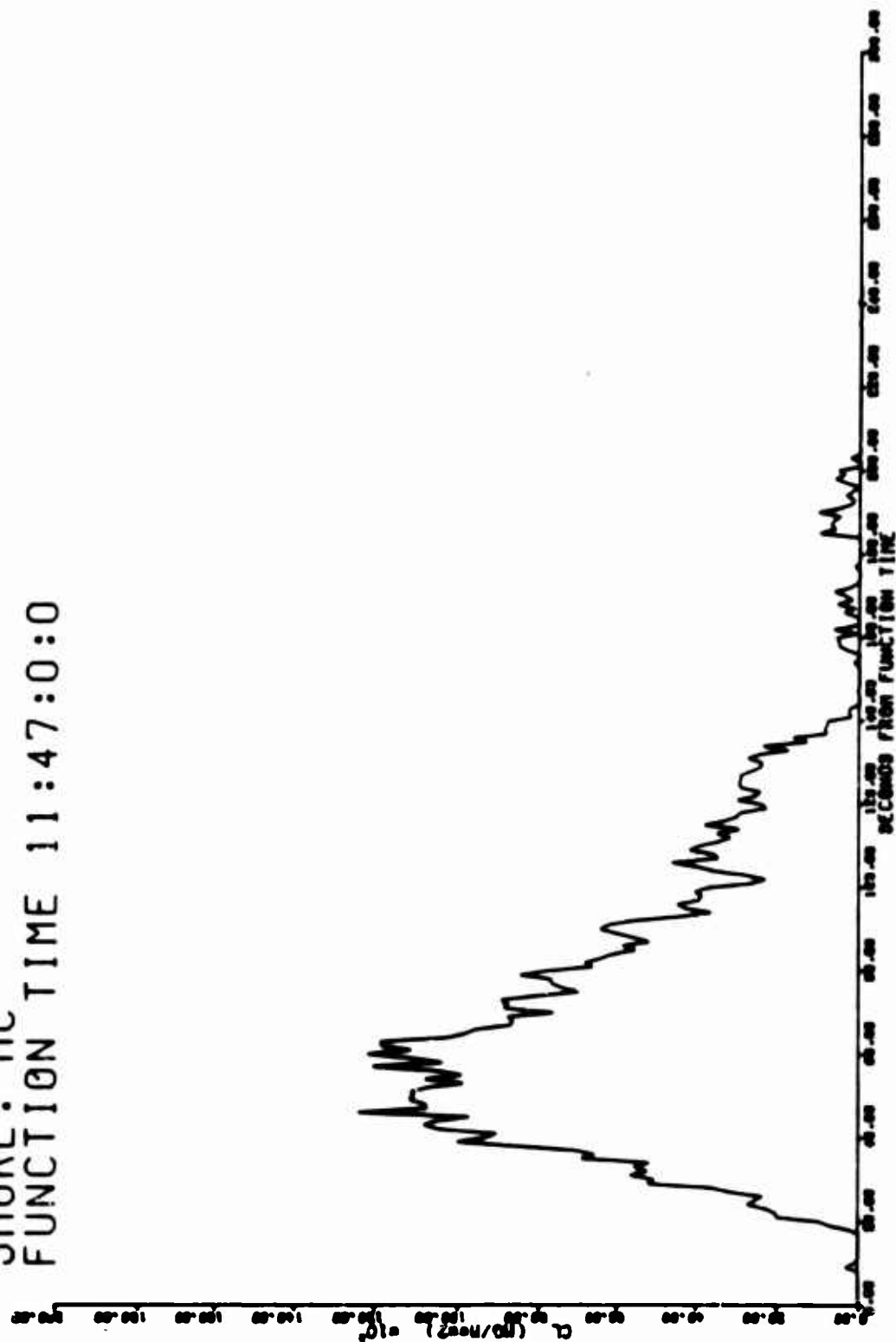
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW 0

TRIAL #27 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0



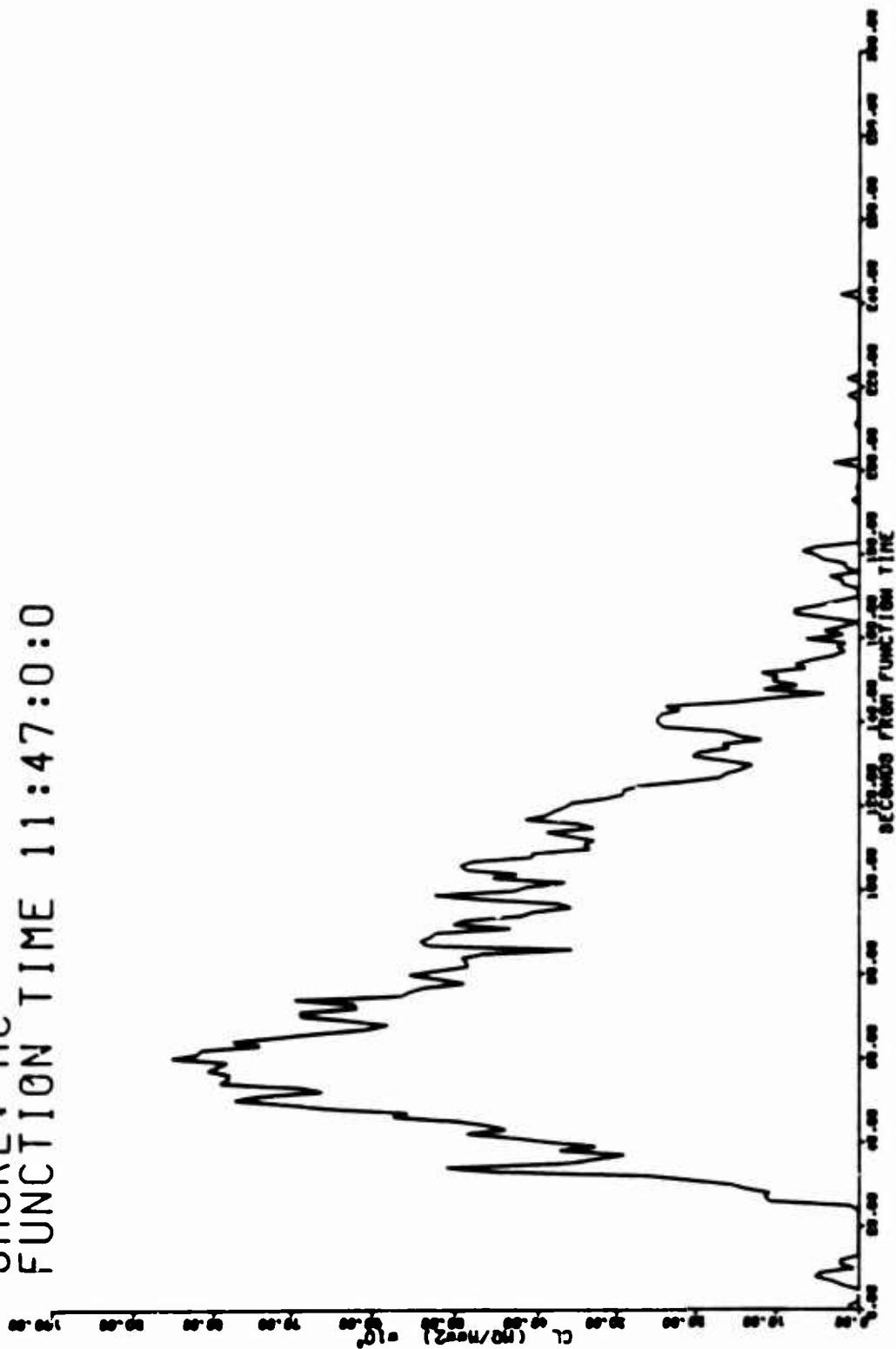
CL VALUES VERSUS TIME FOR RGW M
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #27 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0



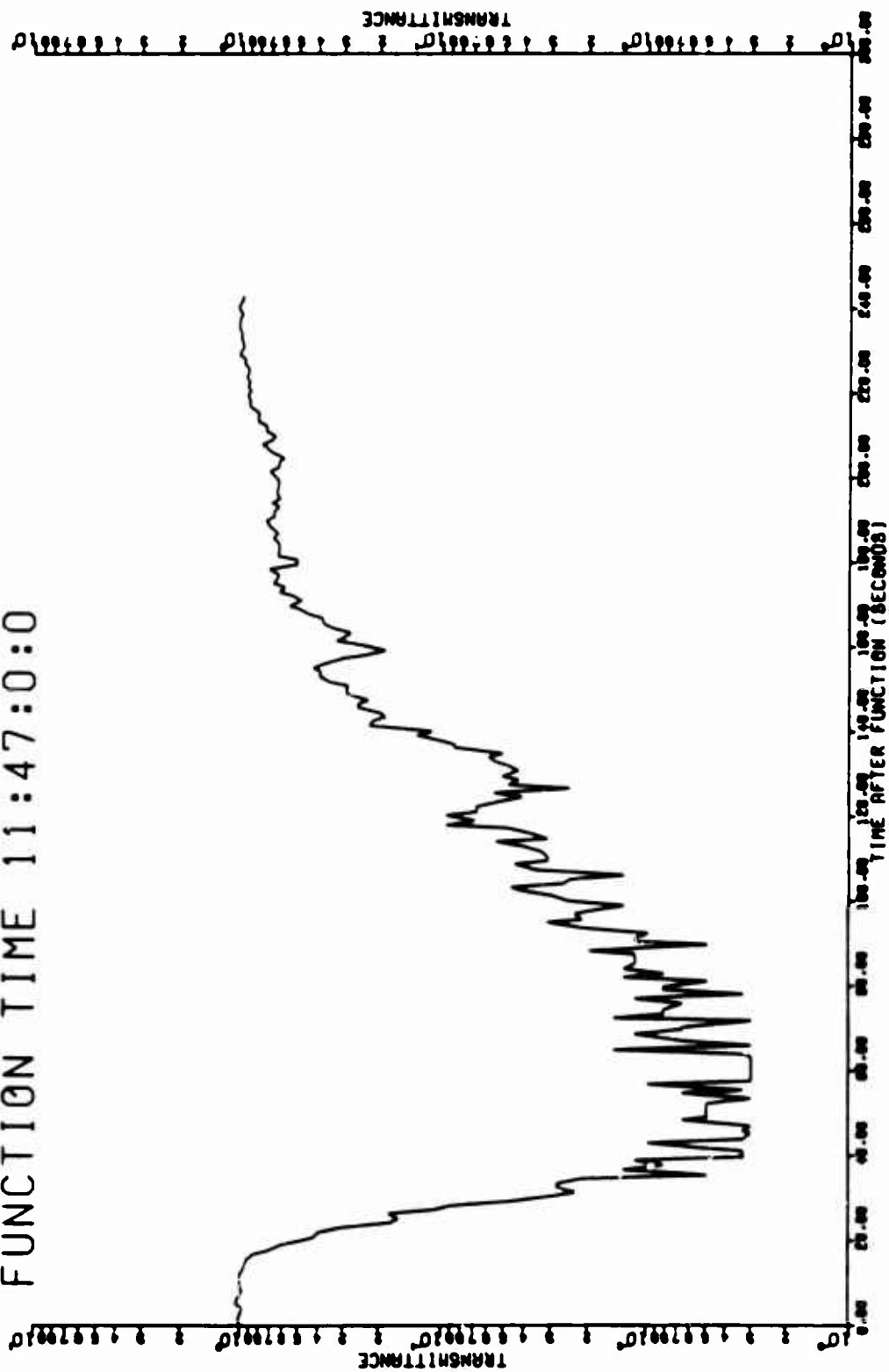
CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



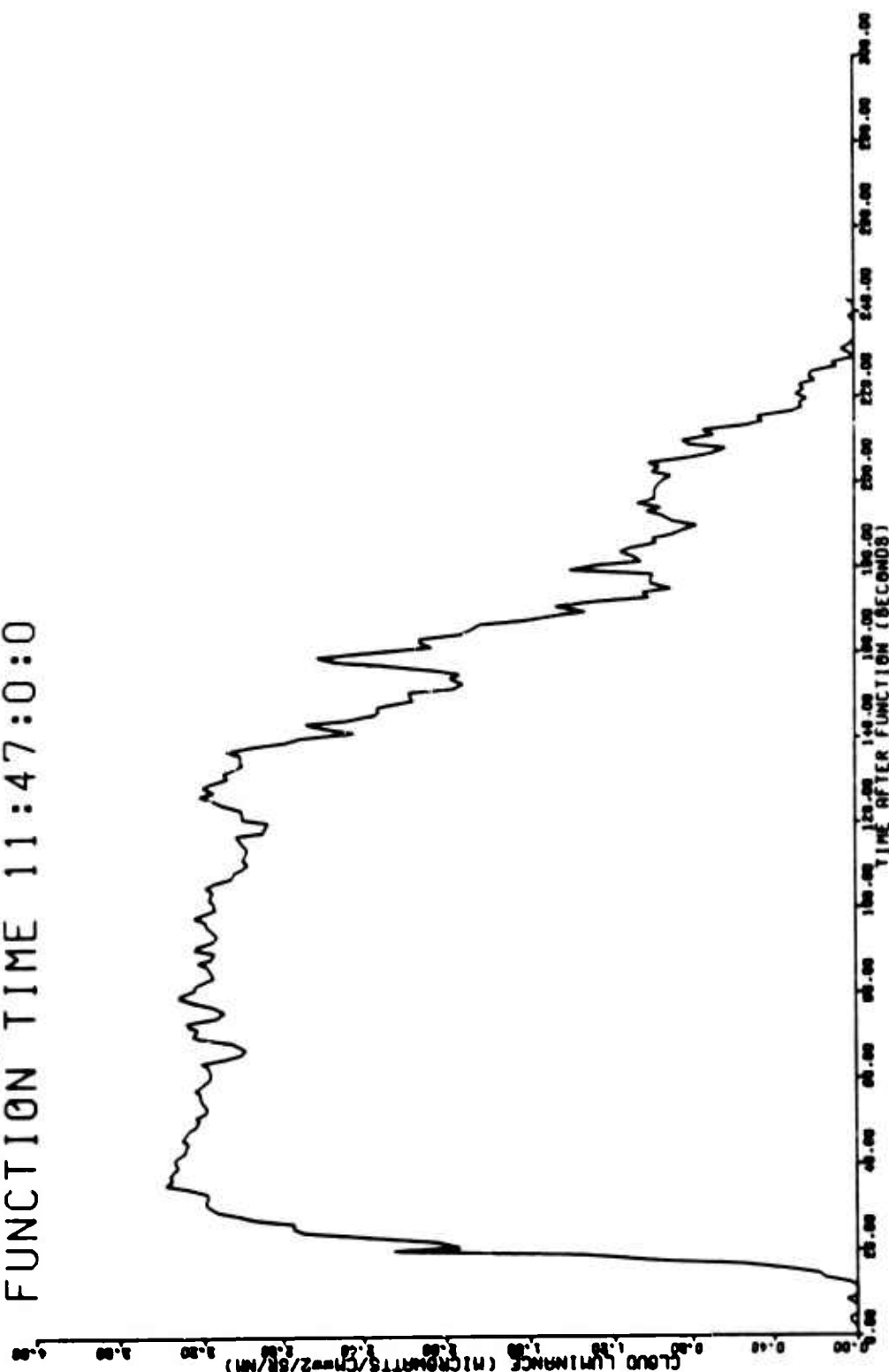
CL VALUES VERSUS TIME FOR ROW Q
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



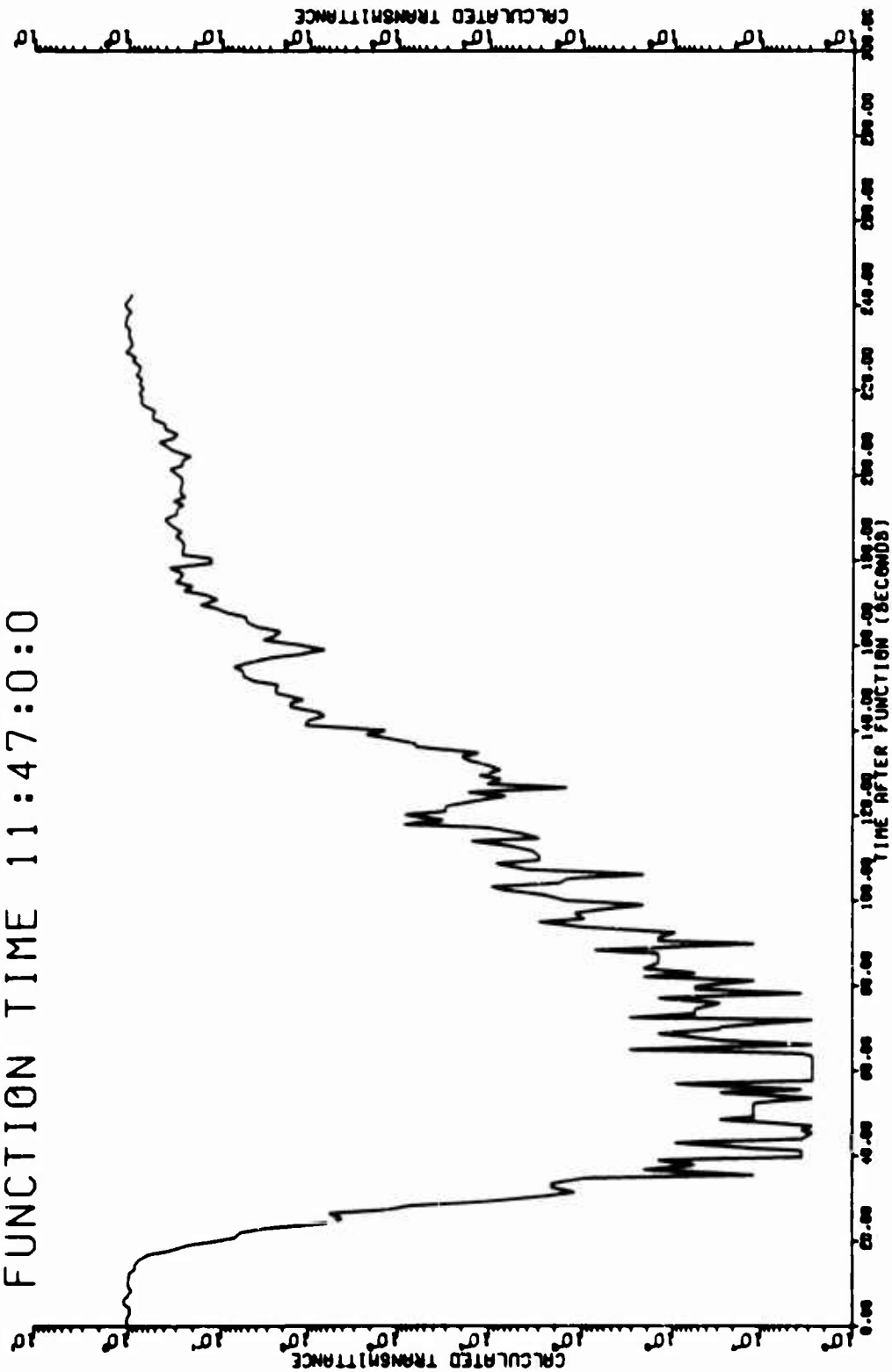
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



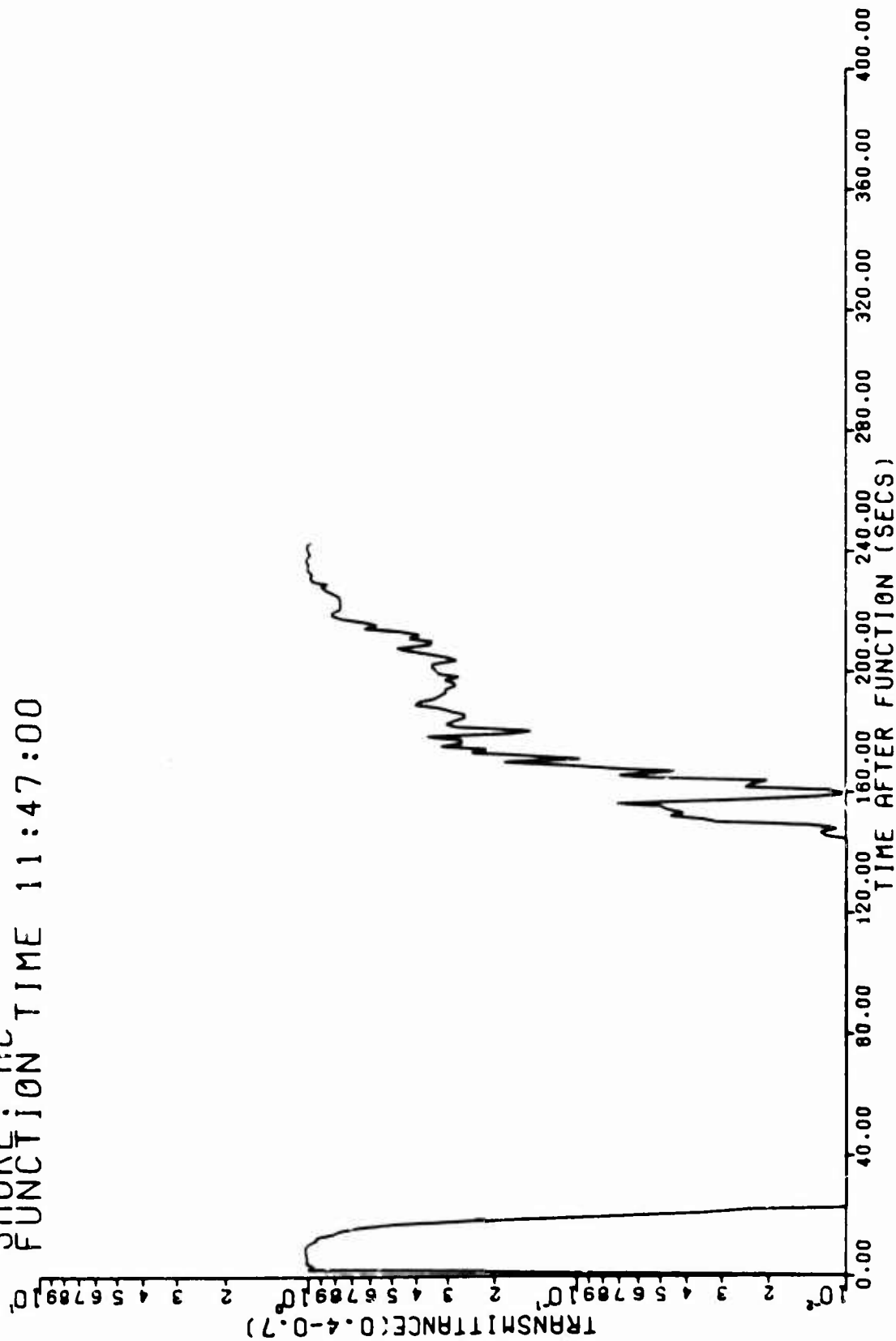
CLOUD LUMINANCE VERSUS TIME FOR
WAVELENGTH 1.060 LOCATED ON ROW 0

TRIAL #27 (DP1-002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:0:0



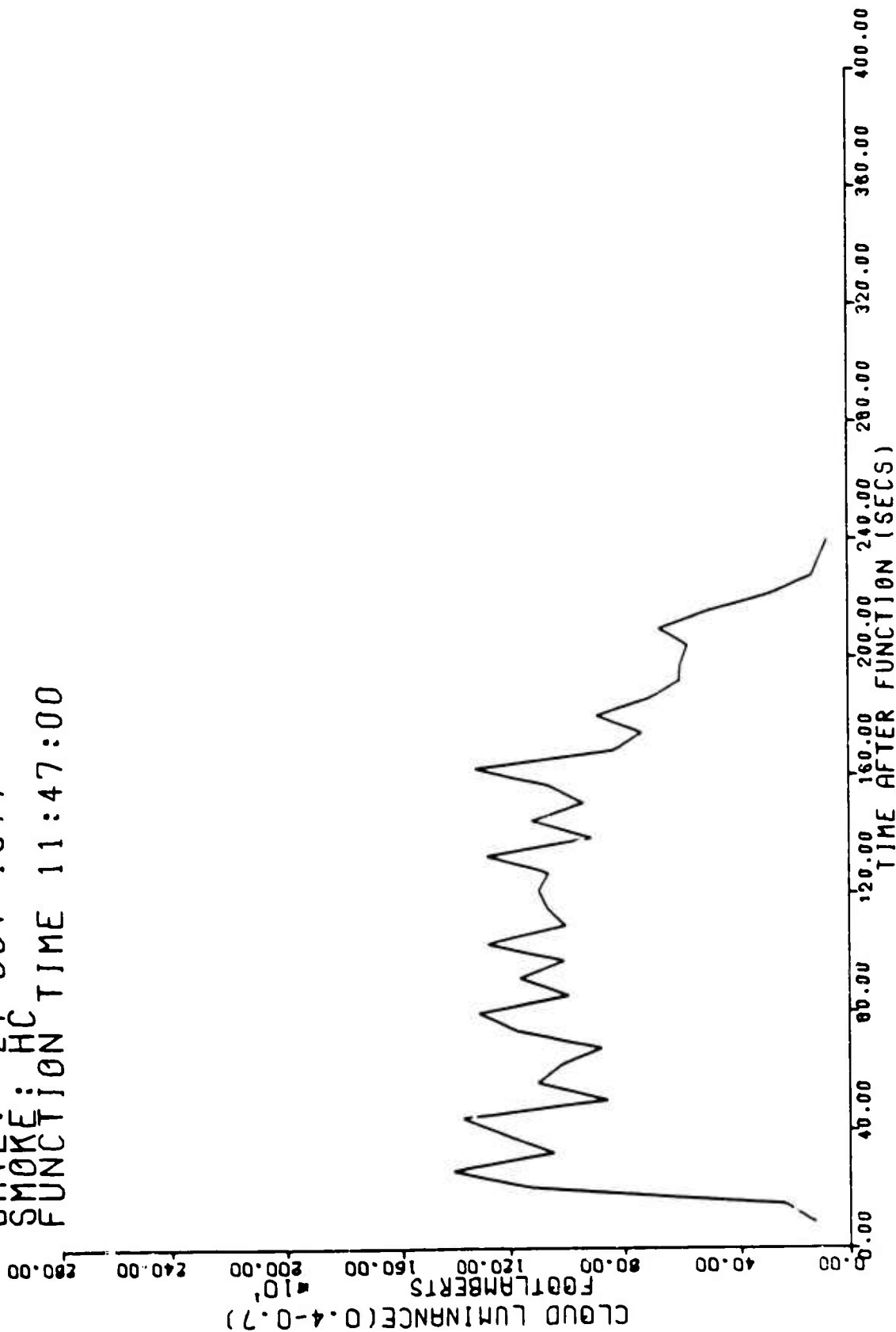
CALCULATED TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 0.4-0.7 LOCATED ON ROW 0

TRIAL 27, LDP-1002)
DATE: 27 OCT 1977
SMOKE: HC
FUNCTION TIME 11:47:00



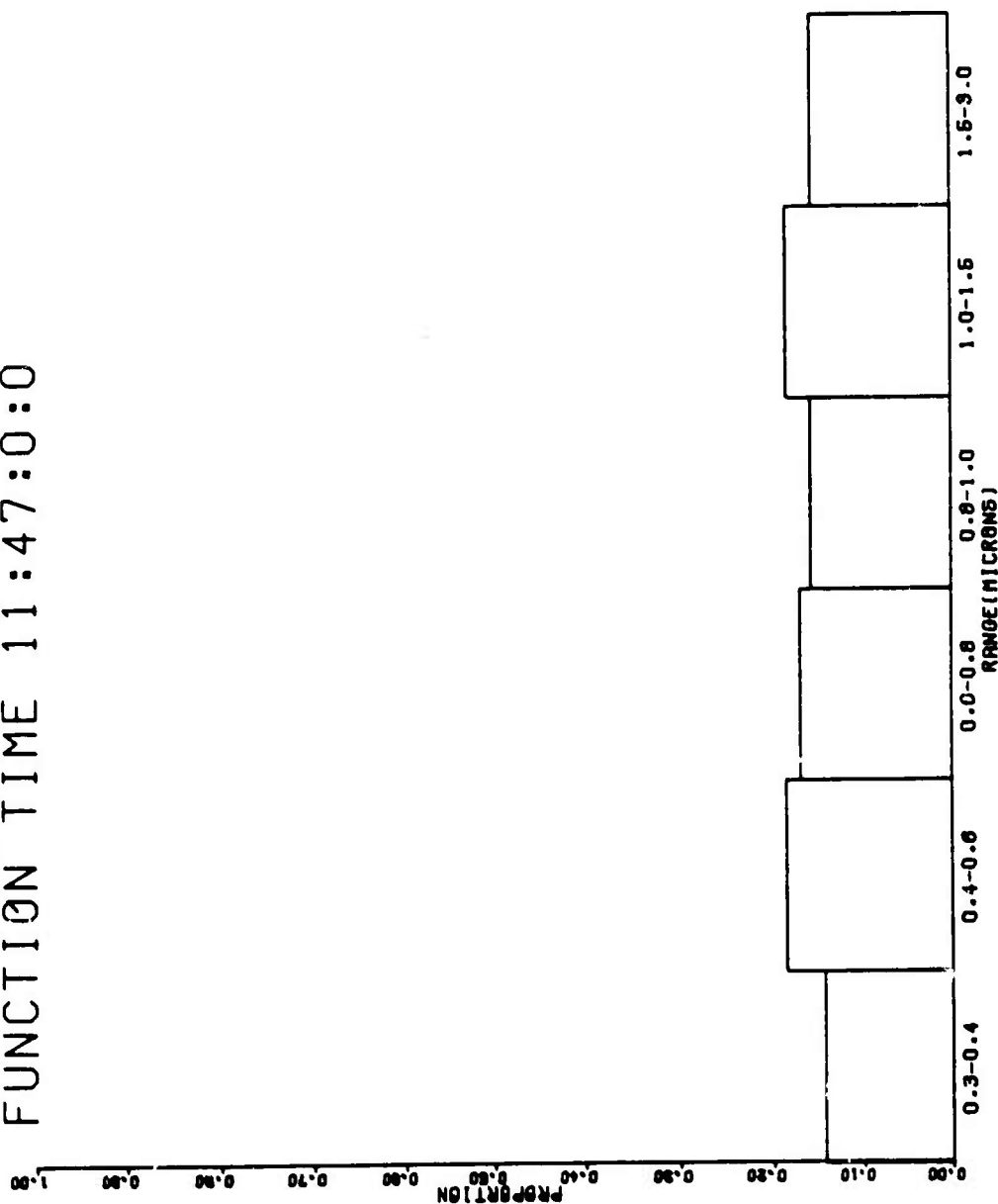
TRANSMITTANCE VS TIME FOR WAVE LENGTH BETWEEN
0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL 27, (DP-1002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:00



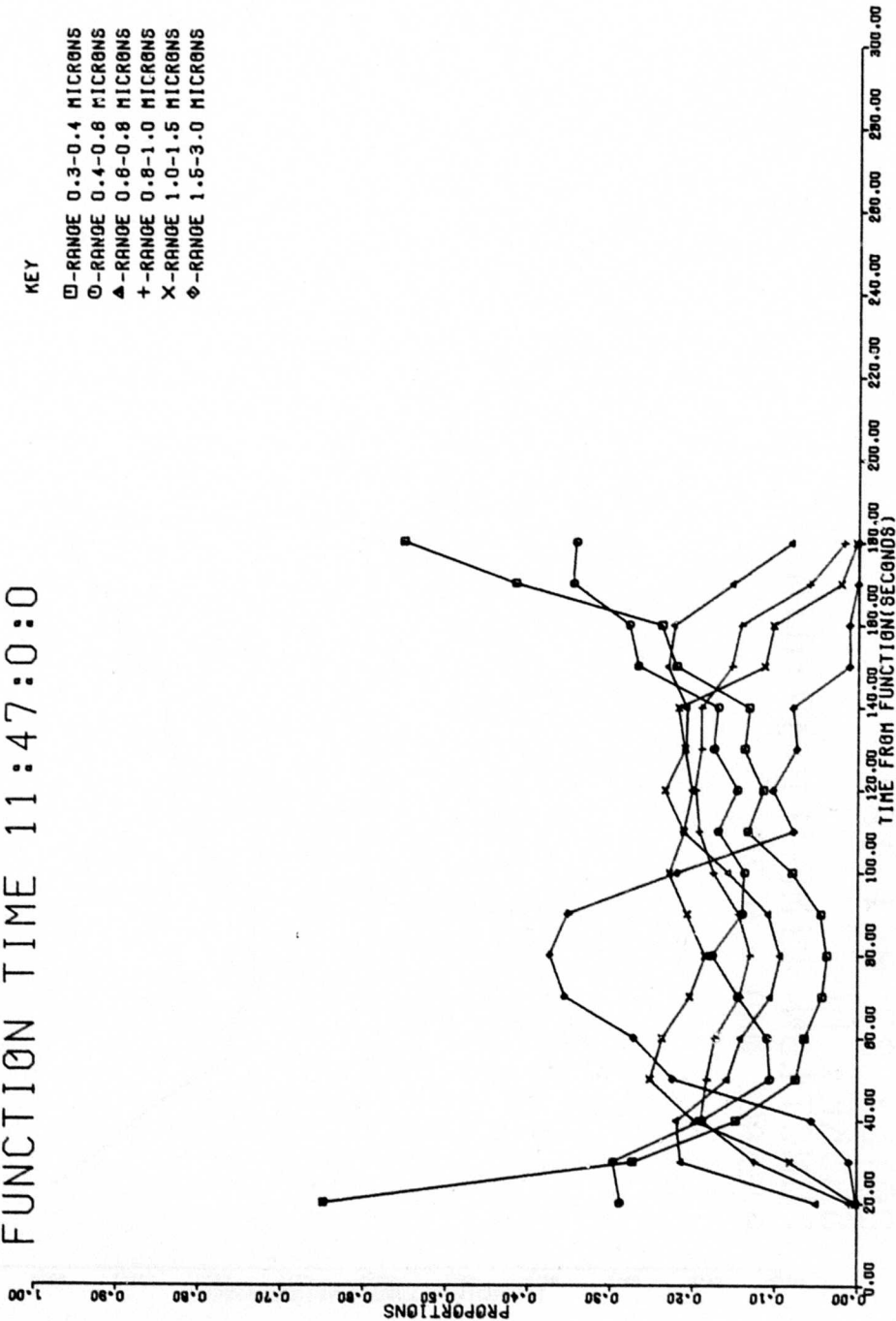
CLOUD LUMINANCE VS TIME FOR WAVE LENGTH BETWEEN
 0.4 AND 0.7 MICRONS MEASURED ALONG ROW 0

TRIAL #27 (D01-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0



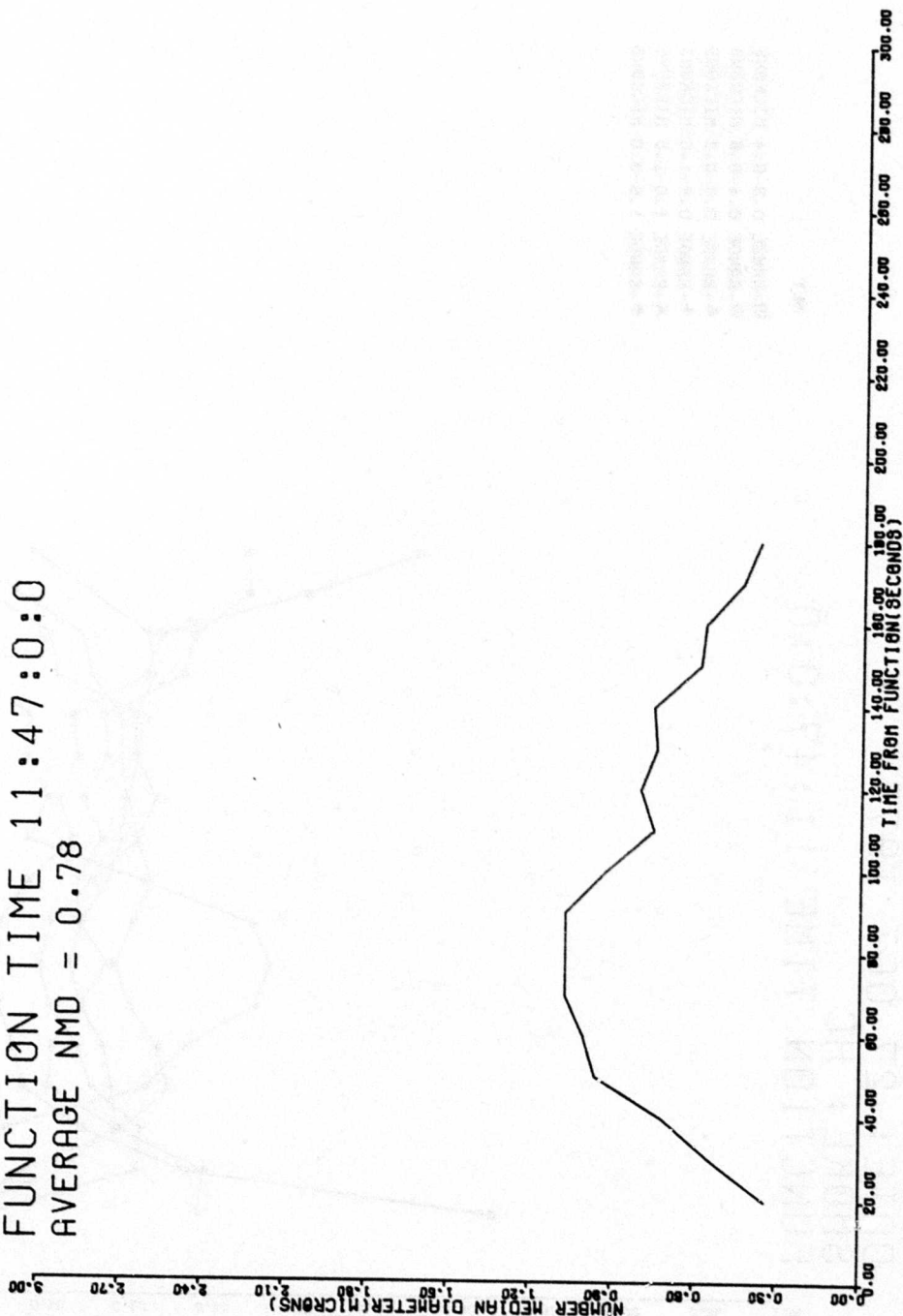
PARTICLE SIZE DISTRIBUTION BASED ON NUMBER

TRIAL #27 (D01-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0



PROPORTION OF PARTICLES IN VARIOUS RANGES (SEE KEY) AS A FUNCTION OF TIME BASED ON NUMBER

TRIAL #27 (D01-002)
 DATE: 27 OCT 1977
 SMOKE: HC
 FUNCTION TIME 11:47:0:0
 AVERAGE NMD = 0.78



AVERAGE NMD AS A FUNCTION OF TIME

APPENDIX B-I-20

TRIAL DP1-002-T-29R2(HC SMOKE) 7 OCT 1977

SUMMARY OF TEST DATA	B-I-20-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-20-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	ND*
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M	
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O	
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q	
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	ND*

*The magnetic tape recorded failed on this trial.

FIGURE:	PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0	ND*
FIGURE:	PARTICLE SIZE DISTRIBUTION . . . . .	|
FIGURE:	PARTICLE SIZE DISTRIBUTION VERSUS TIME	
FIGURE:	NUMBER MEDIAN DIAMETER VERSUS TIME . . . . .		ND*

SUMMARY OF TEST DAY DATA

Trial: DP1-002 #29R-2

Date: 07 Oct 77

Time: 1413:00 MDT

Wind Direction (Transport) (degrees) (4m)	353
Mean Wind Speed (Transport) (\bar{u} , m/sec)	2.8
Temperature at 2-meters, Trial Time (T, °C)	14.1
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	19.8
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	6.6
Temperature Gradient, 0.5-8m (ΔT , °C)	ND
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.13
Pasquill Stability Category	B
Relative Humidity (percent) (2m)	30.0
Solar Azimuth (deg)	197.9
Solar Altitude (deg)	42.6
Air Density - ρ (kg m ⁻³)	1.055
Solar Radiation (Langleys per minute)	1.144
Barometric Pressure (millibars)	873.0
Visibility (km)	113
Reflectivity, OD Target	0.2
Haze (footlamberts)	79
Brightness, Background (footlamberts)	1580
Brightness, White Target (footlamberts)	1378
Brightness, OD Target	350
Percent Opaque Cloud Cover	3

Munitions/Submunitions Used (HC, M5 Smoke Pot)	1
Number of Munitions/Submunitions Functioned	1
Particle Size Range (micron)	
(0.3 - 0.4)	ND
(0.4 - 0.6)	ND
(0.6 - 0.8)	ND
(0.8 - 1.0)	ND
(1.0 - 1.5)	ND
(1.5 - 3.0)	ND
Log ₁₀ NMD	ND
σLog ₁₀ NMD	ND
NMD	ND
MMD	ND

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1413:00	1	1	1
1413:10	20	15	5
1413:20	60	25	5
1413:30	112	60	9
1413:40	113	66	9
1413:50	135	54	11
1414:00	144	42	12
1414:10	128	43	11
1414:20	93	45	9

SKY BRIGHTNESS

Light Meter Readings

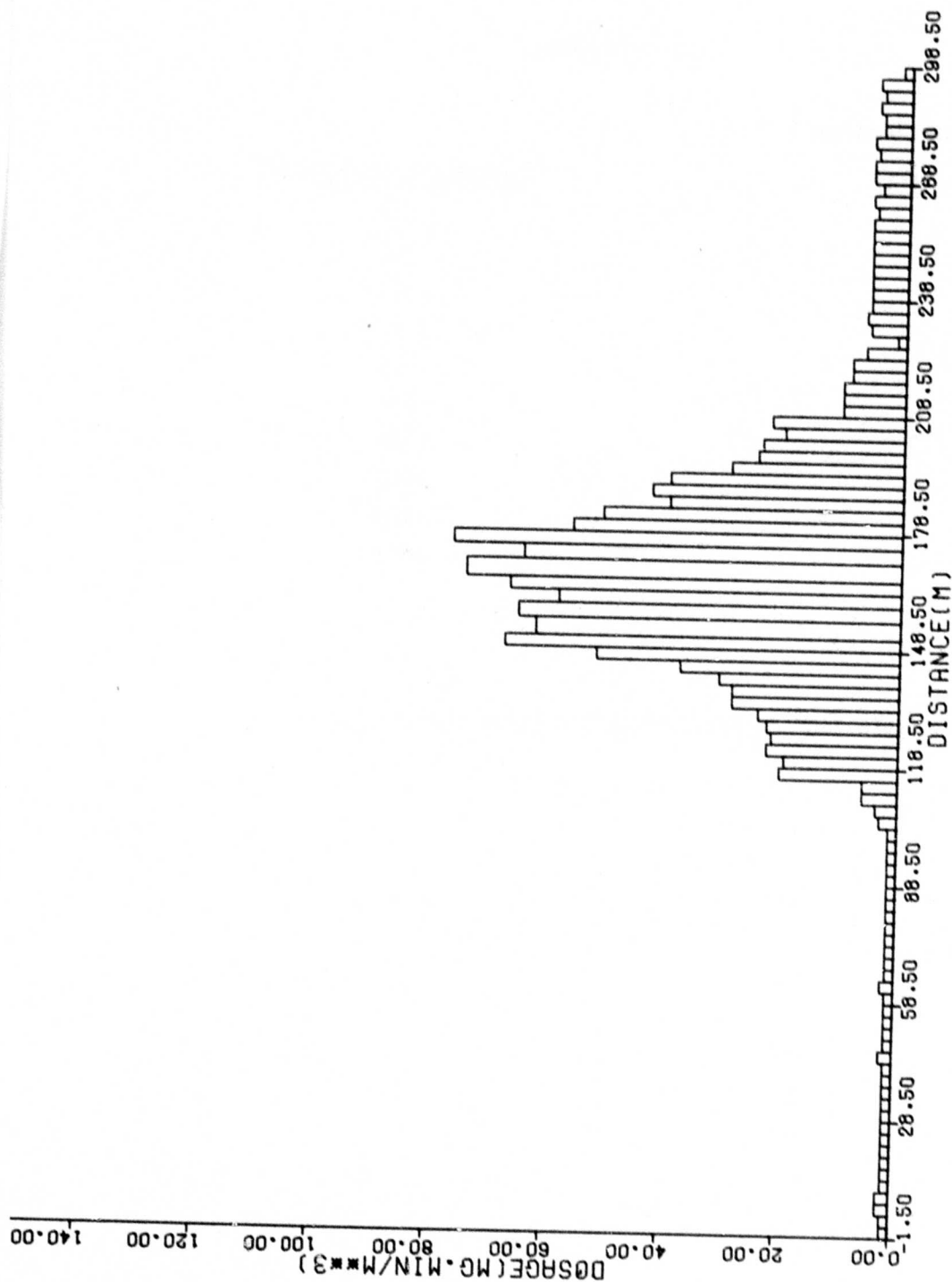
ELEVATION ANGLE

BRIGHTNESS FOOTCANDLES

0	504
5	1084
10	1140
15	1140
20	1140
25	1984
30	1984
35	1640
40	1640
45	1640

Viewing azimuth 240° except 255° at 0 degrees elevation

B-I-20-6



TRIAL 29R2(DP-1002), 7 OCT 1977, 14:13:00, HC SMOKE

APPENDIX B-I-21

TRIAL DP1-002-T-11WP SMOKE) 7 Oct 1977

SUMMARY OF TEST DATA	B-I-21-3
FIGURE: PLOT OF DOSAGE VERSUS DISTANCE ALONG ROW O	B-I-21-6
FIGURE: PLOT OF CL VALUES ALONG ROW O DETERMINED USING THE AEROSOL PHOTOMETERS.	ND
FIGURE: TIME-CONCENTRATION PROFILES AT INDICATED SAMPLING POSITION ON ROW O.	ND
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-21-7
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-21-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-21-9
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-21-10
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M .	B-I-21-11
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O .	B-I-21-12
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW Q .	B-I-21-13
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	ND
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 1.0632 μ m (BAND WIDTH \pm 0.008 μ m) FOR ROW O.	ND
FIGURE: PLOT OF CALCULATED TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m FOR ROW O.	ND
FIGURE: PLOT OF TRANSMITTANCE FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	ND

FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH
0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW 0 ND

FIGURE: PARTICLE SIZE DISTRIBUTION ND

FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME ND

FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME ND

SUMMARY OF TEST DAY DATA

Trial: 11

Date: 7 October 1977

Time: 1135:00

Wind Direction (Transport) (degrees) (4m)	002
Mean Wind Speed (Transport) (\bar{u} , m/sec)	5.3
Temperature at 2-meters, Trial Time (T, °C)	13.0
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	11.9
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m).	4.0
Temperature Gradient, 0.5-8m (ΔT , °C)	-2.7
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8M)	0.15
Pasquill Stability Category	C
Relative Humidity (percent) (2m)	49
Solar Azimuth (deg)	145.8
Solar Altitude (deg)	38.2
Air Density - ρ (kg m ⁻³)	1.066
Solar Radiation (Langleys per minute)	1.144
Barometric Pressure (millibars)	873.6
Visibility (km)	96
Reflectivity, OD Target	0.06
Haze (footlamberts)	20
Brightness, Background (footlamberts)	1580
Brightness, White Target (footlamberts)	2740
Brightness, OU Target (footlamberts)	350
Percent Opaque Cloud Cover	10

Munitions/Submunitions Used (WP 4.2 inch) 8

Number of Munitions/Submunitions Functioned 8

Particle Size Range (micron)*

(0.3 - 0.4)

(0.4 - 0.6)

(0.6 - 0.8)

(0.8 - 1.0)

(1.0 - 1.5)

(1.5 - 3.0)

$\text{Log}_{10}\text{NMD}$

$\sigma \text{Log}_{10}\text{NMD}$

NMD

MMD

*No data Available

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1335:00	8	44	4
1335:10	47	51	13
1335:20	143	58	21
1335:30	288	90	21
1335:40	325	93	29
1335:50	332	102	33
1336:00	Cloud traveled out of field-of-view of cameras		

SKY BRIGHTNESS

Light Meter Readings

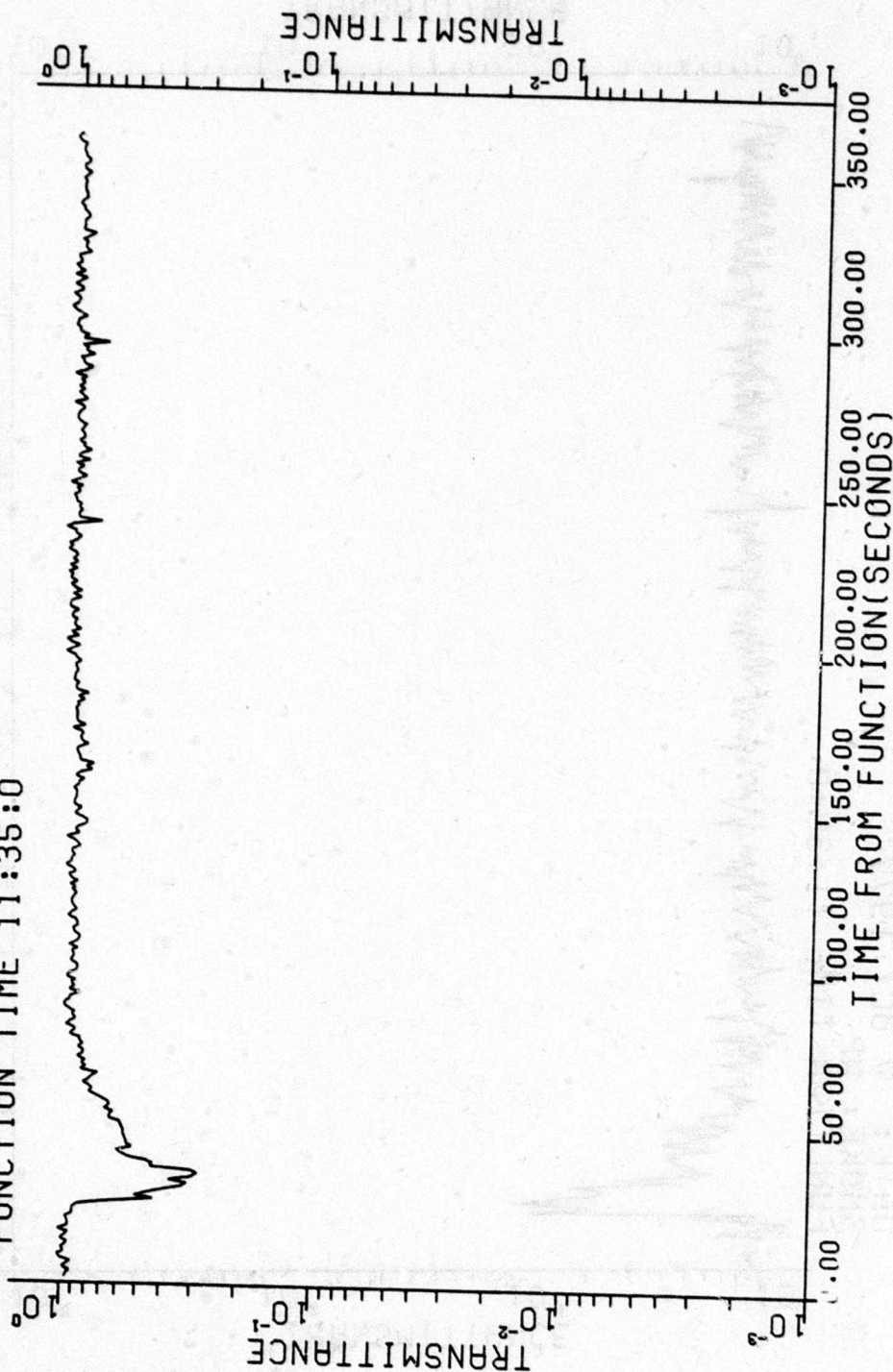
ELEVATION ANGLE (Deg)

BRIGHTNESS FOOTCANDLES

0	652
5	2668
10	2888
15	2888
20	1300
25	1300
30	1300
35	1300
40	1084
45	1084

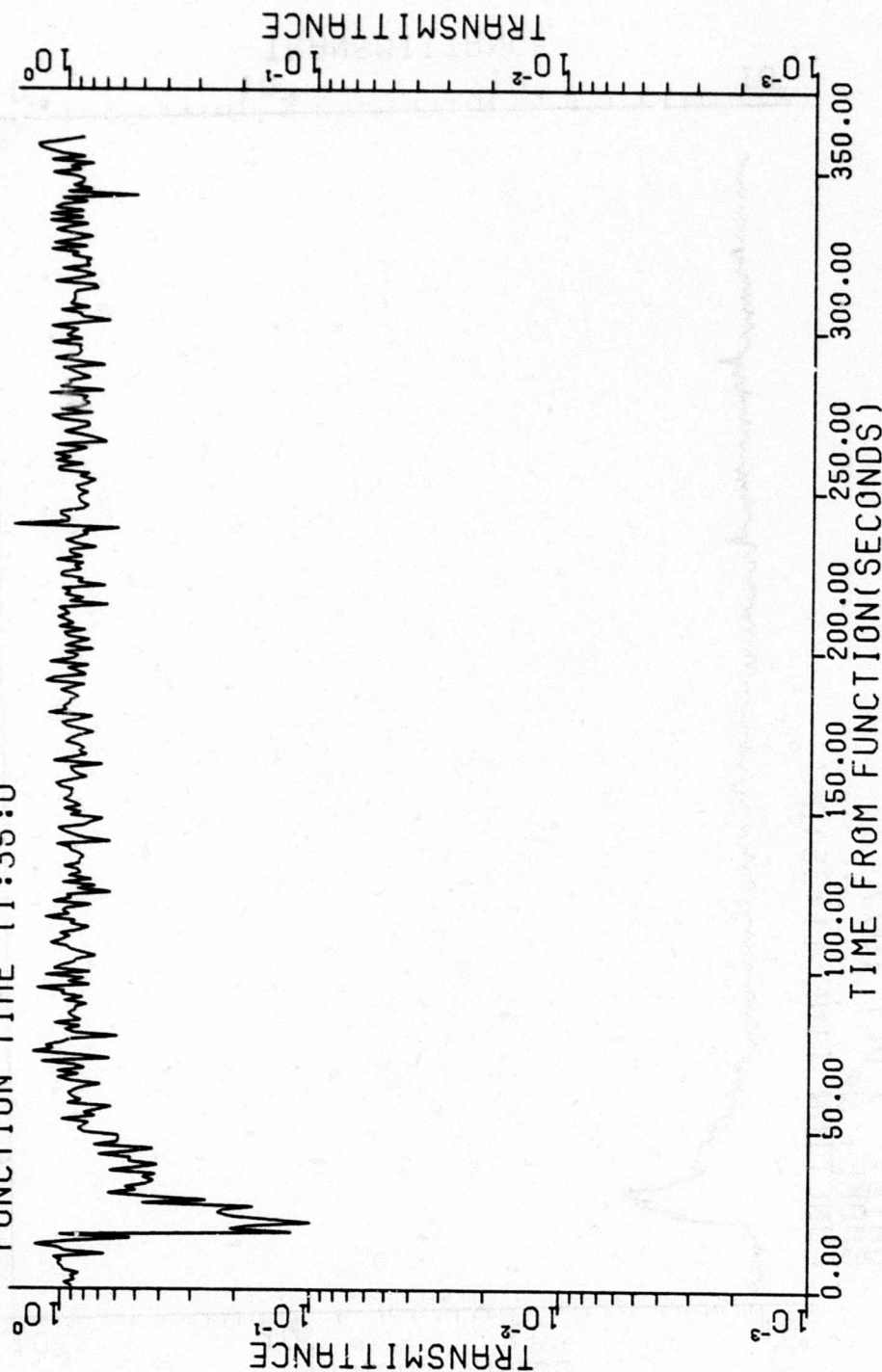
Viewing azimuth 240° except 255° at 0 degrees elevation.

TRIAL #T11 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 11:35:0



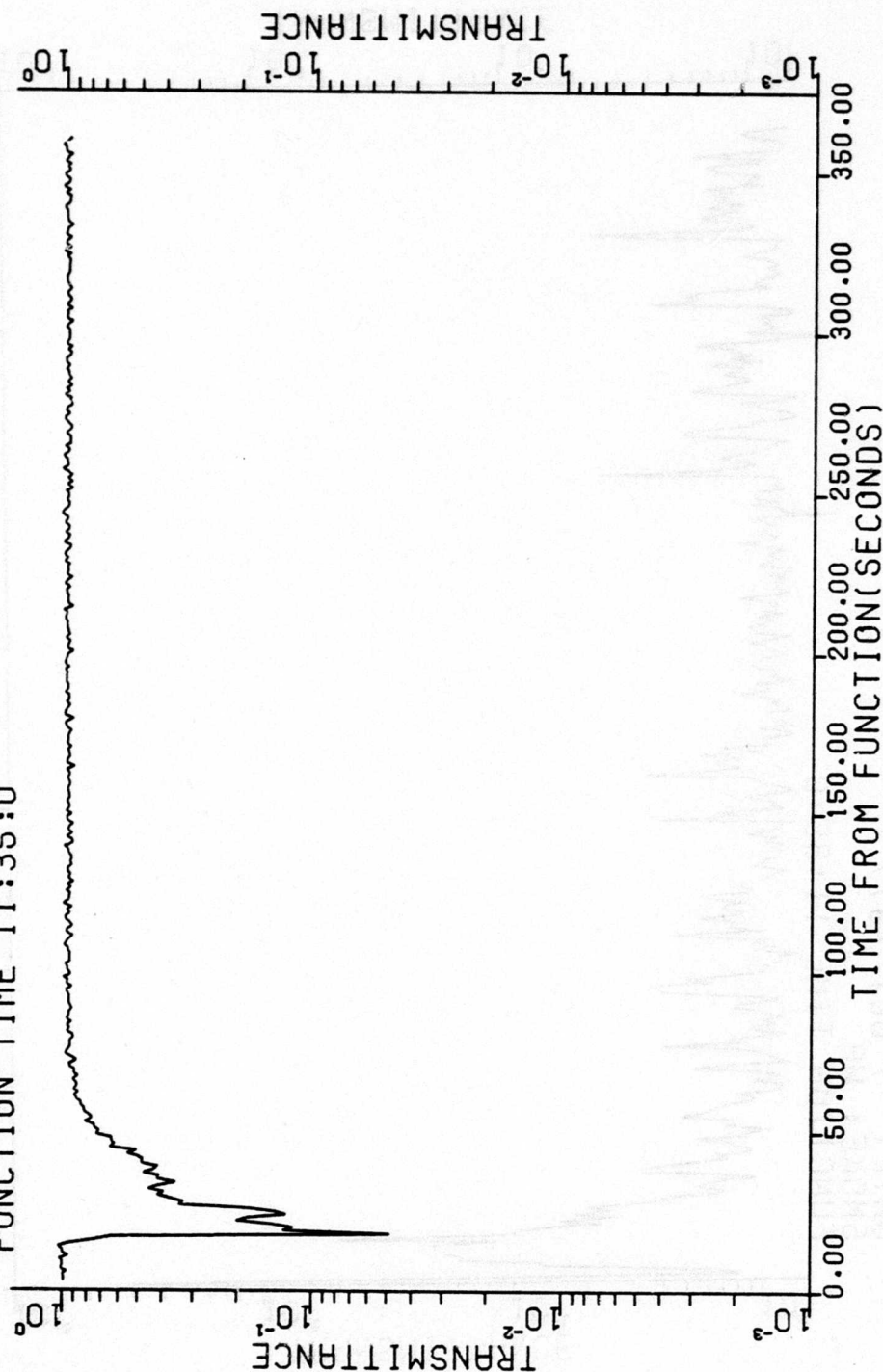
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #111 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 11:35:0



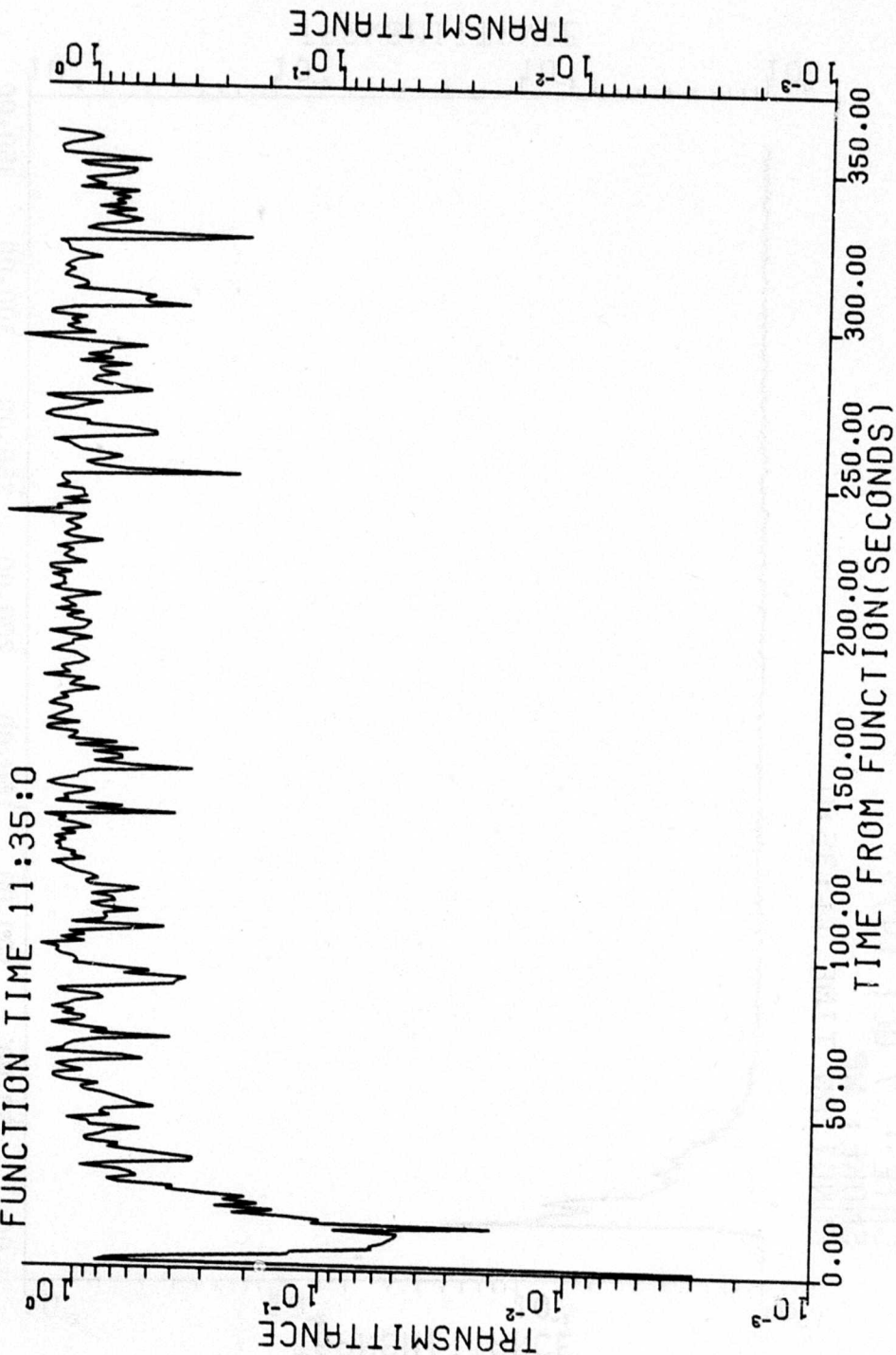
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #T11 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 11:35:0



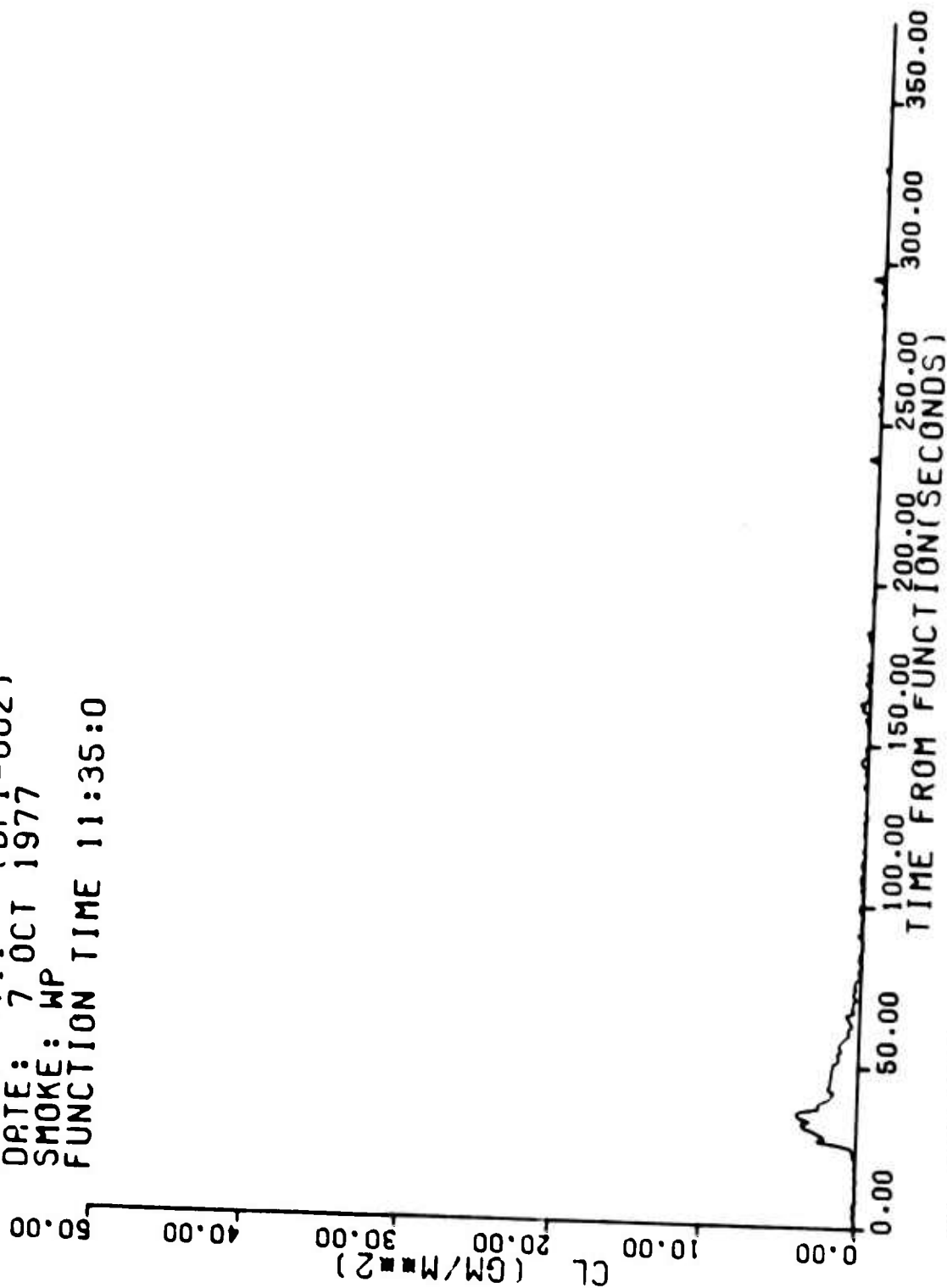
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #I11 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 11:35:0



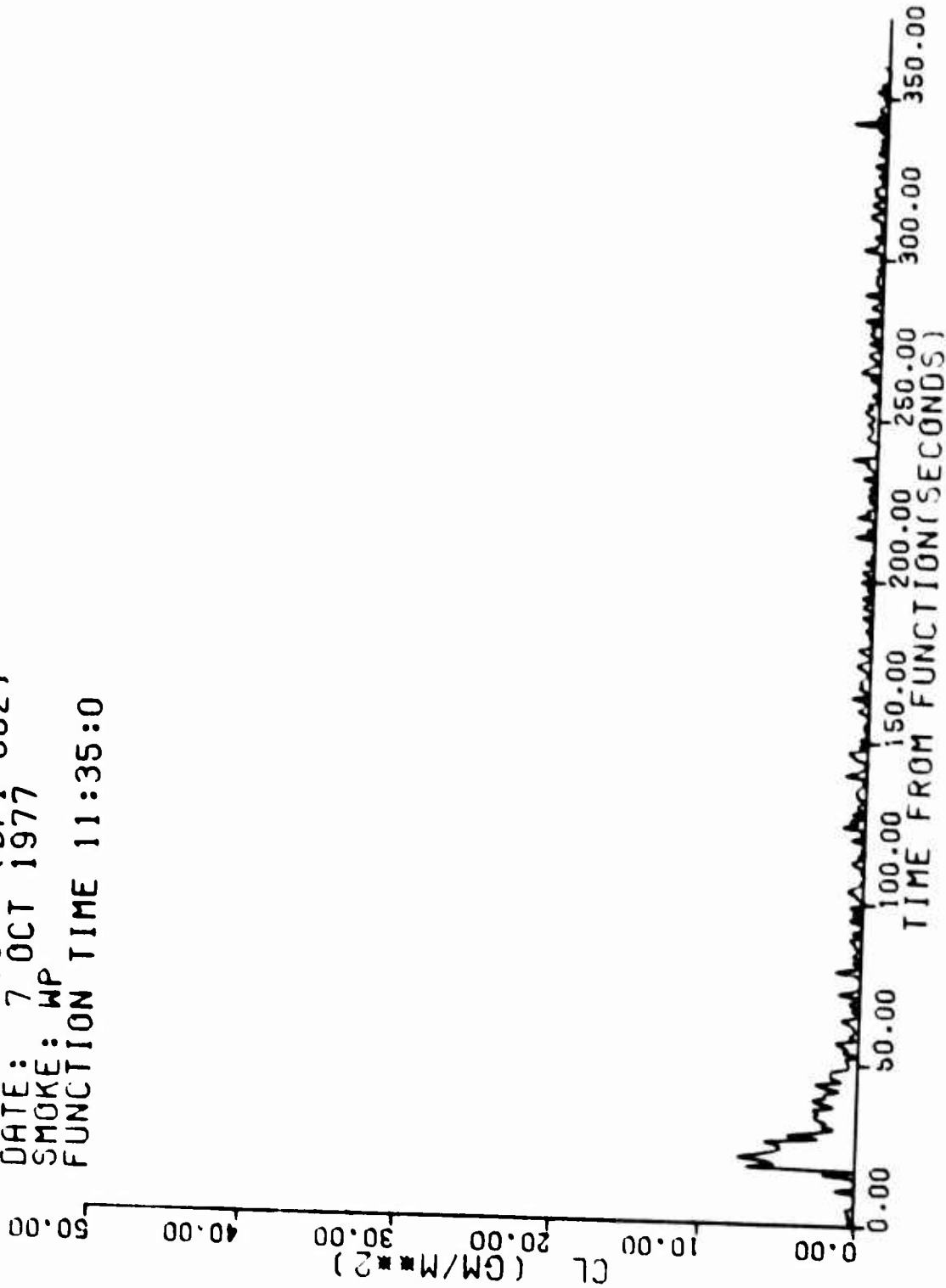
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #111 (DP1-002)
DATE: 7 OCT 1977
SMOKE: WP
FUNCTION TIME 11:35:0



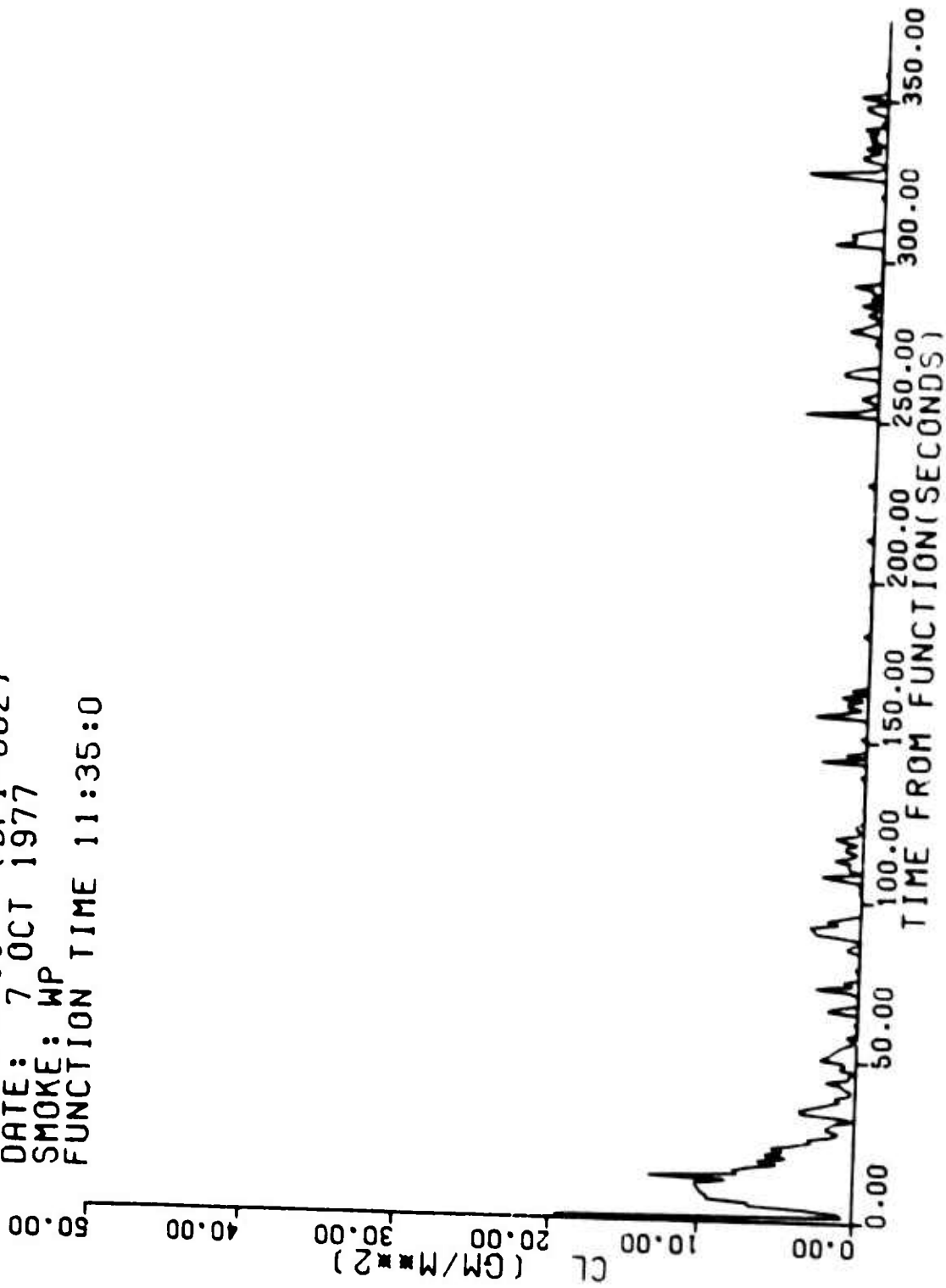
CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #111 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 11:35:0



CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #T11 (DP1-002)
 DATE: 7 OCT 1977
 SMOKE: WP
 FUNCTION TIME 11:35:0



CL VALUES VERSUS TIME FOR ROW Q
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

APPENDIX B-I-22

TRIAL DP1-002-T-13 (PWP SMOKE) 27 OCT 77

SUMMARY OF TEST DATA	B-I-22-3
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW M	B-I-22-6
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.443 μ m (BAND WIDTH \pm 0.079 μ m) ALONG ROW O	B-I-22-7
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 9.750 μ m (BAND WIDTH \pm 2.121 μ m) ALONG ROW O	B-I-22-8
FIGURE: PLOT OF TRANSMITTANCE VERSUS TIME FOR WAVELENGTH 3.383 μ m (BAND WIDTH \pm 0.098 μ m) ALONG ROW Q	B-I-22-9
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW M.	B-I-22-10
FIGURE: PLOT OF CALCULATED CL VALUES VERSUS TIME FOR ROW O.	B-I-22-11
FIGURE: PLOT OF CALUCLATED CL VALUES VERSUS TIME FOR ROW Q.	B-I-22-12
FIGURE: PLOT OF CLOUD LUMINANCE VERSUS TIME FOR WAVELENGTH 0.4-0.7 μ m (PHOTOPIC CORRECTED) FOR ROW O	
FIGURE: PARTICLE SIZE DISTRIBUTION	ND
FIGURE: PARTICLE SIZE DISTRIBUTION VERSUS TIME	ND
FIGURE: NUMBER MEDIAN DIAMETER VERSUS TIME	ND

SUMMARY OF TEST DAY DATA

Trial: 13

Date: 27 October 1977

Time: 1418:00

Wind Direction (Transport) (degrees) (4m)	171
Mean Wind Speed (Transport) (\bar{u} , m/sec)	7.1
Temperature at 2-meters, Trial Time (T, °C)	23.0
Std. Dev. in Azimuth Wind Angle (σ_a , degrees) (8m)	16.8
Std. Dev. in Elevation Wind Angle (σ_e , degrees) (8m)	4.9
Temperature Gradient, 0.5-8m (ΔT , °C)	-1.4
Power-Law Exponent of Vertical Profile of Mean Wind Speed (P) (2m-8m)	0.13
Pasquill Stability Category	D
Relative Humidity (percent) (2m)	25
Solar Azimuth (deg)	198.4
Solar Altitude (deg)	35
Air Density - ρ (kg m ⁻³)	1.014
Solar Radiation (Langley's per minute)	1.024
Barometric Pressure (millibars)	862.9
Visibility (km)	80
Reflectivity, OD Target	0.05
Haze (footlamberts)	175
Brightness, Background (footlamberts)	1200
Brightness, White Target (footlamberts)	1050
Brightness, OD Target (footlamberts)	525
Percent Opaque Cloud Cover	20

Munitions/Submunitions Used (PWP 4.2 inch) 1

Number of Munitions/Submunitions Functioned 1

Particle Size Range (micron)*

(0.3 - 0.4)

(0.4 - 0.6)

(0.6 - 0.8)

(0.8 - 1.0)

(1.0 - 1.5)

(1.5 - 3.0)

Log₁₀NMD

^JLog₁₀NMD

NMD

MMD

*No data Available

Initial Cloud Dimensions (Meters)

<u>Time</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
1418:00	2	1	2
1418:10	83	20	7
1418:20	135	27	8
1418:30	186	27	11
1418:40	240	28	11
1418:50	192	15	8
1419:00	45	12	5
1419:10	Cloud too thin to determine size		

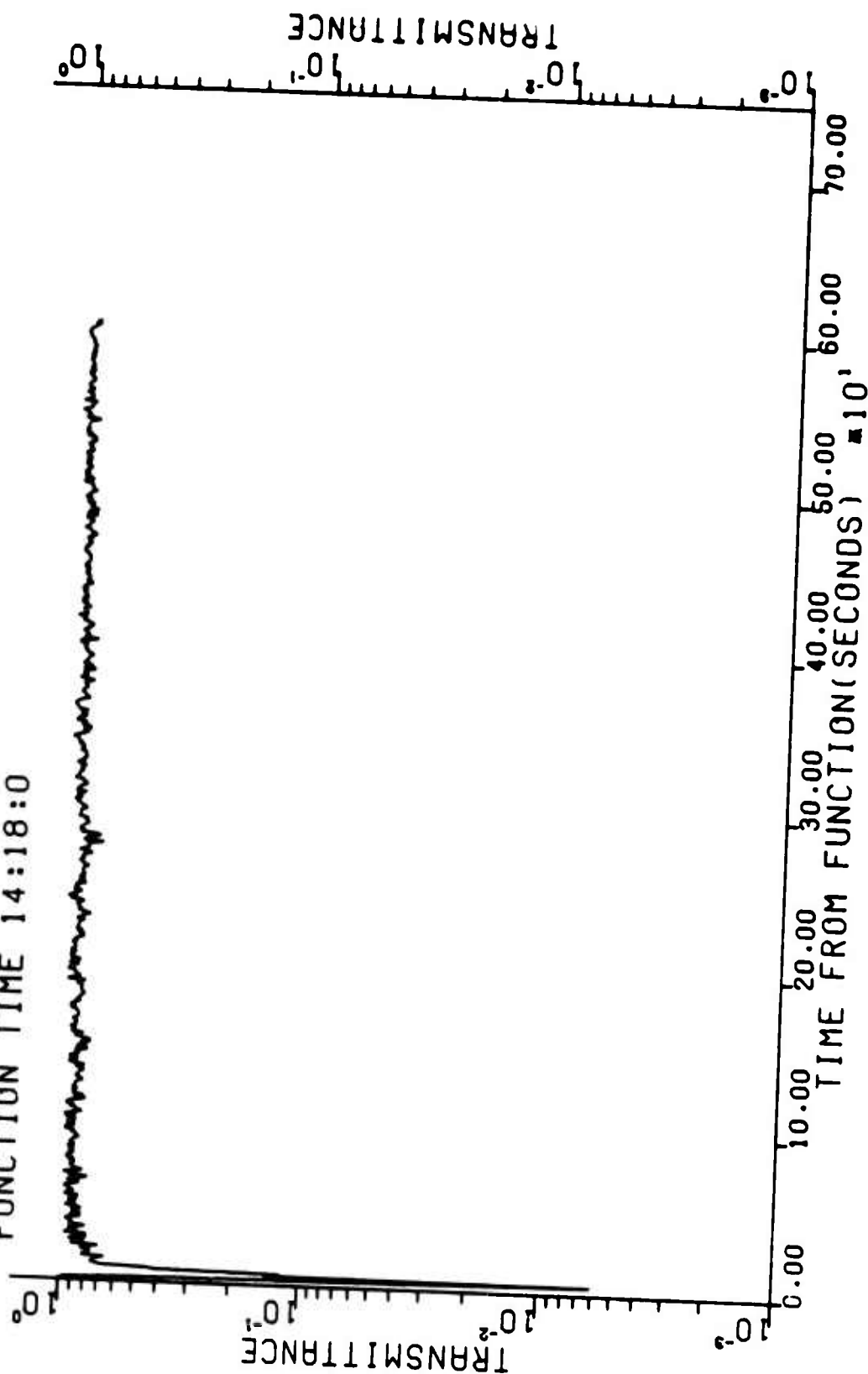
SKY BRIGHTNESS

Light Meter Readings

<u>ELEVATION ANGLE (Deg)</u>	<u>BRIGHTNESS (FOOTCANDLES)</u>
0	652
5	1140
10	1140
15	1140
20	1300
25	1300
30	1300
35	1140
40	1140
45	1140

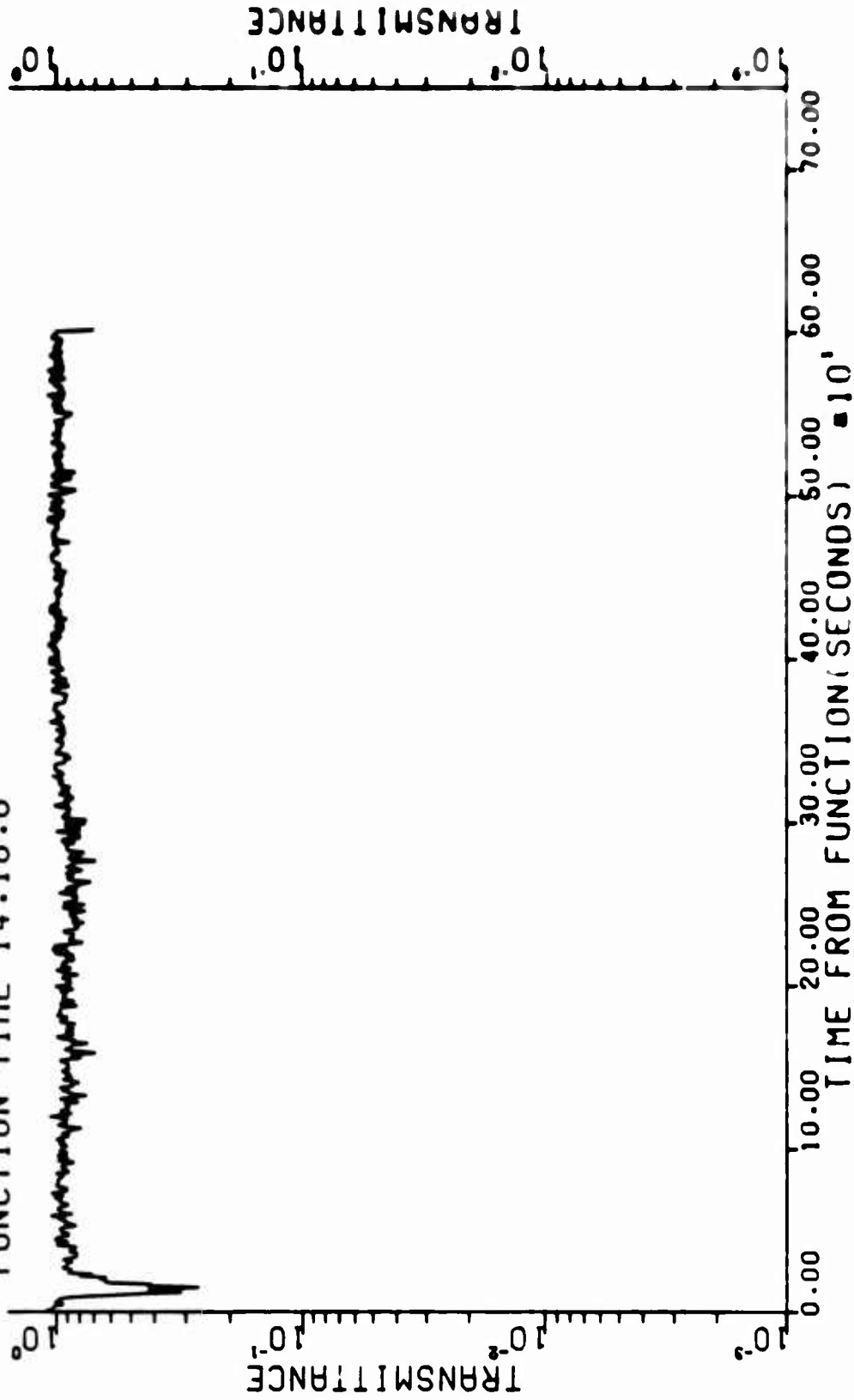
Viewing azimuth 240° except 255° at 0 degrees elevation.

TRIAL #T13 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 14:18:0



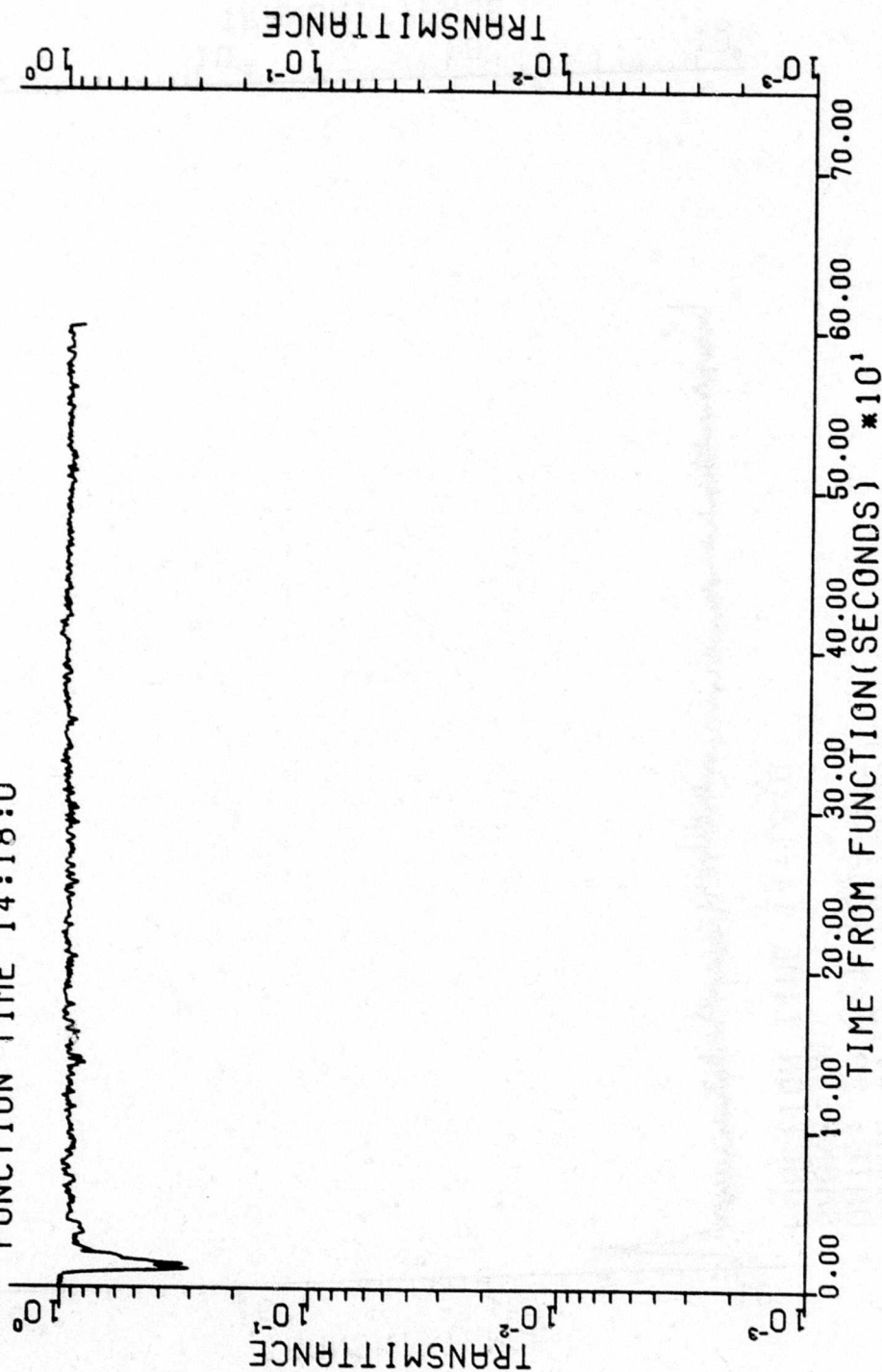
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW M

TRIAL #T13 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 14:18:0



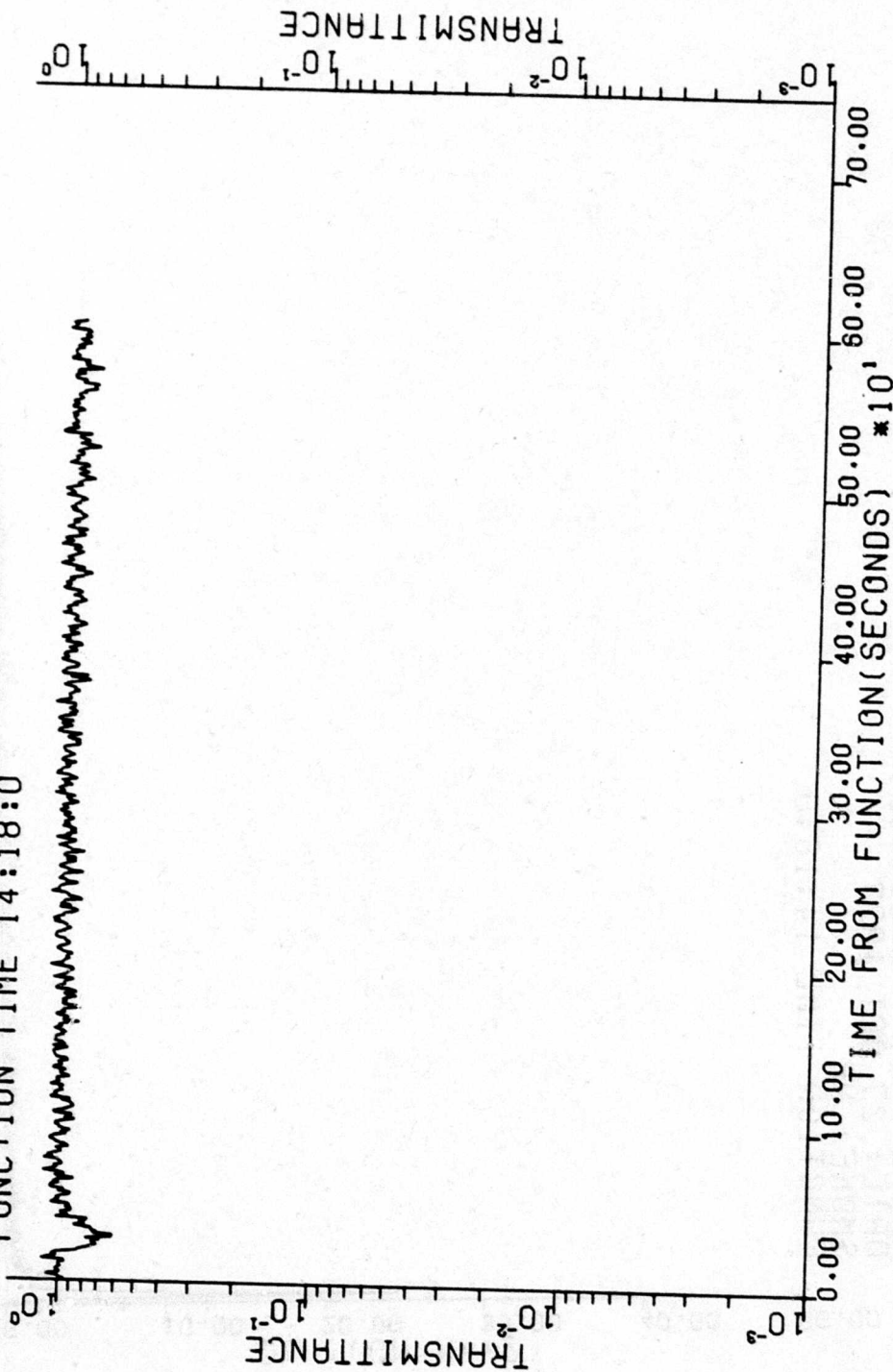
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.443 LOCATED ON ROW 0

TRIAL #118 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 14:18:0



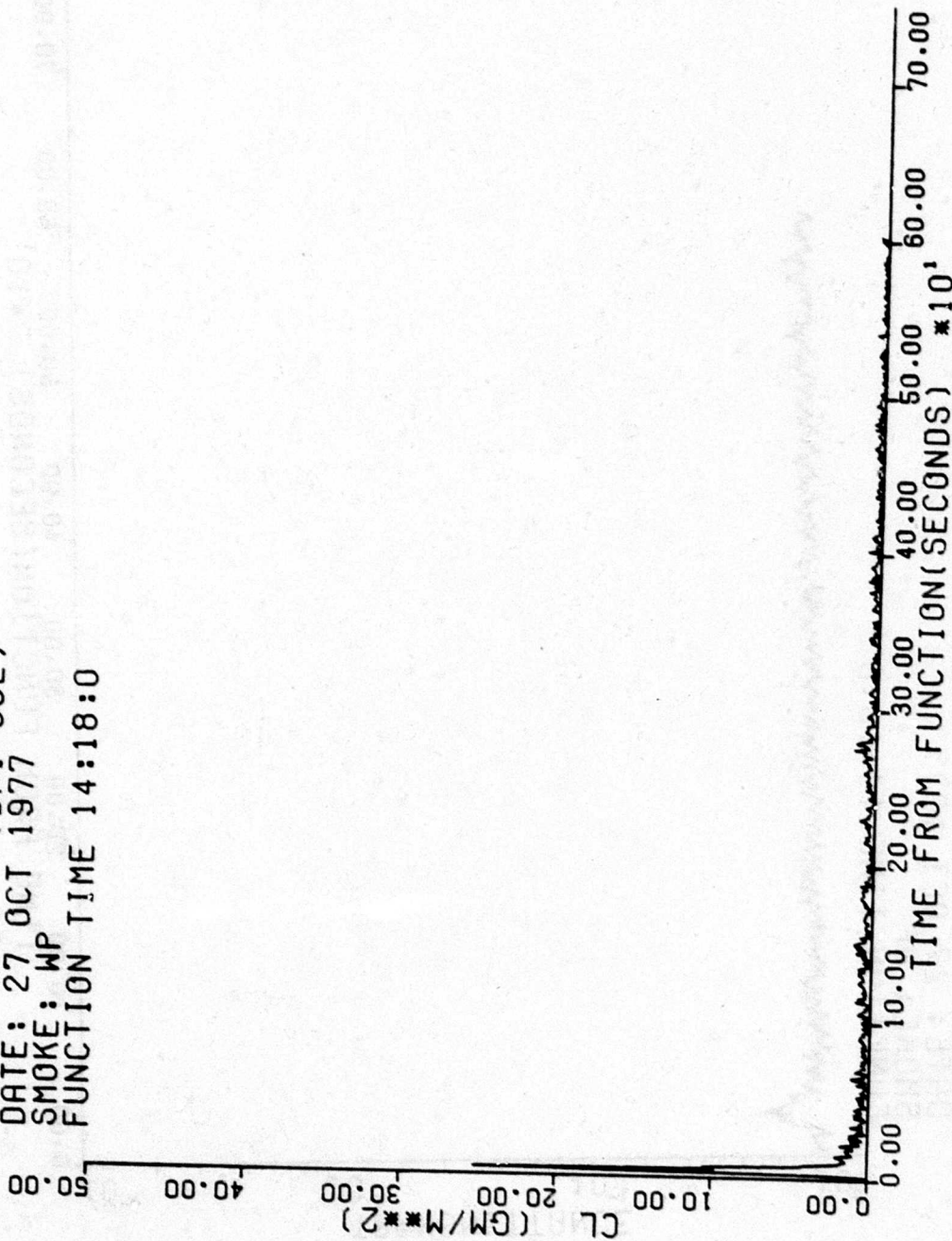
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 9.750 LOCATED ON ROW 0

TRIAL #T13 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 14:18:0



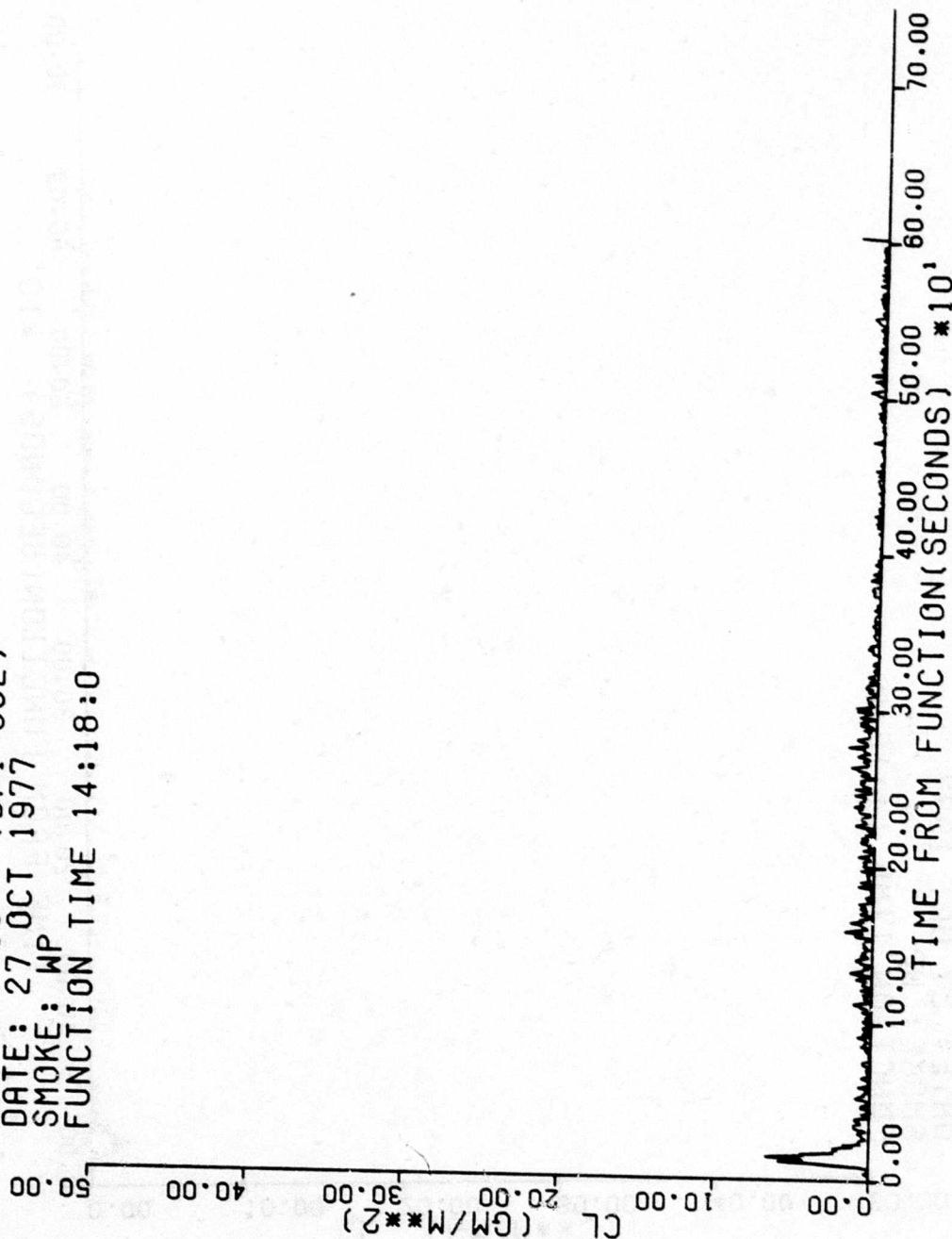
TRANSMITTANCE VERSUS TIME FOR
WAVELENGTH 3.383 LOCATED ON ROW Q

TRIAL #T13 (DP1-002)
DATE: 27 OCT 1977
SMOKE: WP
FUNCTION TIME 14:18:0



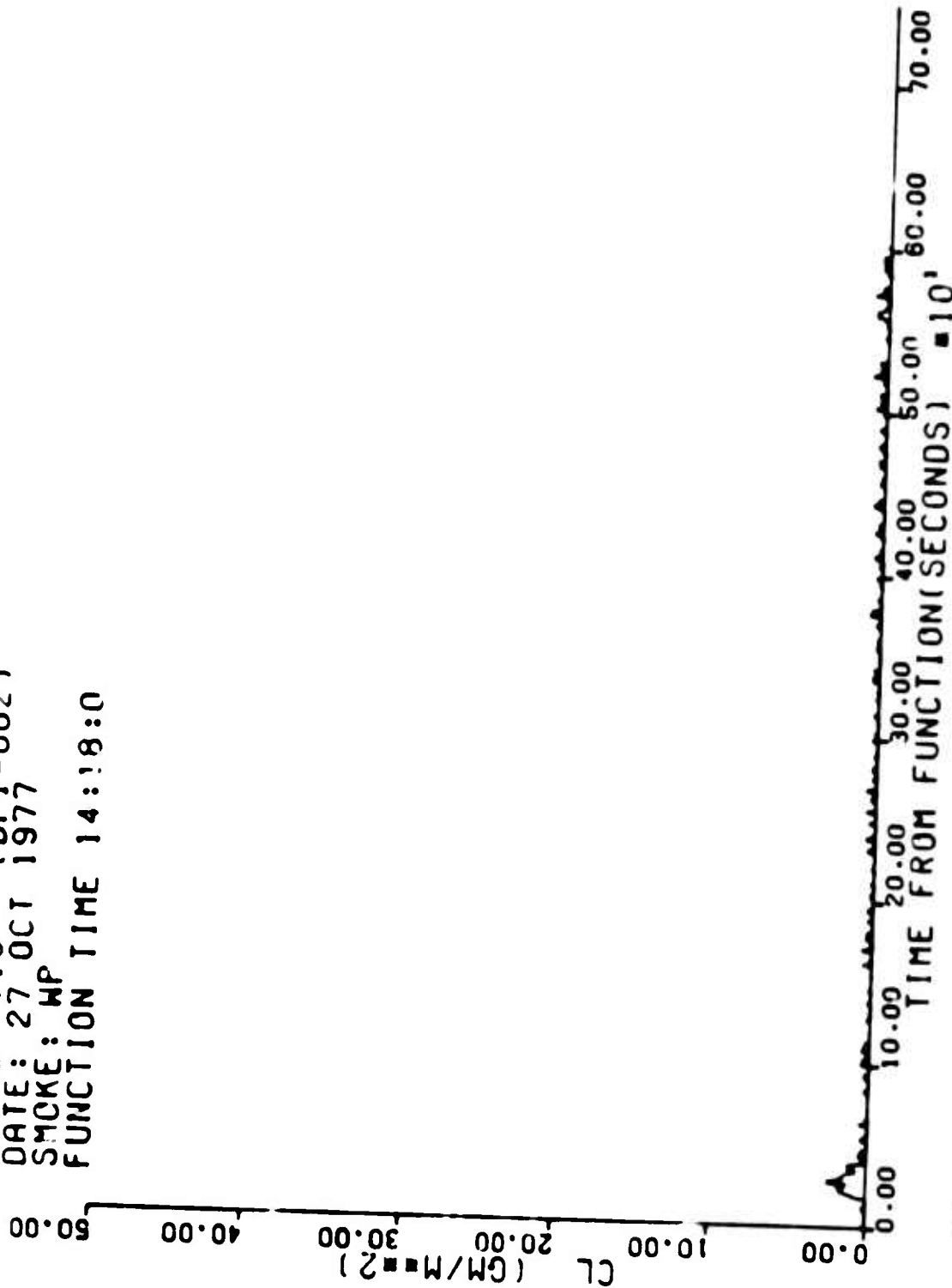
CL VALUES VERSUS TIME FOR ROW M
CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #T13 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:18:0



CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

TRIAL #113 (DP1-002)
 DATE: 27 OCT 1977
 SMOKE: WP
 FUNCTION TIME 14:18:0



CL VALUES VERSUS TIME FOR ROW 0
 CALCULATED USING TRANSMITTANCE AND EXTINCTION COEFFICIENT

APPENDIX C. DISTRIBUTION LIST

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